CALFED

TECHNICAL REPORT
AFFECTED ENVIRONMENT

SUPPLEMENT TO VEGETATION & WILDLIFE

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SUPPLEMENT TO VEGETATION & WILDLIFE

The following information supplements the Vegetation & Wildlife Affected Environment Technical Report.

SOURCES OF INFORMATION

Special-status species are plants and animals that are legally protected under the state and federal Endangered Species Acts (ESAs) or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. For the purpose of this programmatic study, special-status plants are species in the following categories:

- Plants listed or proposed for listing as threatened or endangered under the federal ESA (50 Code of Federal Regulations [CFR] 17.12 [listed plants] and various notices in the Federal Register [proposed species])
- Plants listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 California Code of Regulations [CCR] 670.5)
- Plants that are candidates for possible future listing as threatened or endangered under the federal ESA (61 Federal Register 40, February 28, 1996)

Special-status animals are species in the following categories:

- Animals listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.11 [listed animals] and various notices in the Federal Register [proposed species])
- Animals that are candidates for possible future listing as threatened or endangered under the federal ESA (61 Federal Register 40, February 28, 1996)
- Animals listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 CCR 670.5)

Specific literature reviews and field surveys for sensitive species will be conducted prior to the implementation of any CALFED project facility. Appropriate documentation for agency submittal will also occur on a project-by-project basis.

ENVIRONMENTAL SETTING - ALL REGIONS

Table S-1 (at the end of this Supplement) compares vegetation types used in this document with other California vegetation classification systems. Table S-2 (at the end of this Supplement) includes common

and scientific names of plant species potentially occurring in the study area. Table S-3 (at the end of this Supplement) lists common and scientific names of wildlife species potentially occurring in the study area.

Plant Communities & Associated Wildlife

Common natural communities are vegetation/habitat types that cover relatively large areas and are not significantly threatened or declining (for example, most conifer forest, chaparral, and annual/non-native grassland communities). The following natural community descriptions are based on those in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). See Table S-1 for a comparison of vegetation types used in this document to those of the CNPS, DFG (Holland 1986), and Wieslander (1945) map types. Table 2 (in the technical report) summarizes existing acreages of natural communities and agricultural crops in the Sacramento River, San Joaquin River, Delta, and Bay regions.

Plant and animal common names are used throughout this document. For a complete list of scientific and common names refer to Tables S-2 and S-3. The scientific nomenclature for plants follows Hickman (1993), except for some rare species that follow Skinner and Pavlik (1994). Table S-4 lists species by habitat guild for each region.

UPLAND COMMUNITIES

MIXED CONIFER FOREST

Mixed conifer vegetation is an assemblage of conifer and hardwood species that forms a multilayered forest. Canopies often approach 100% closure. Where openings are present, the forest floor is often covered with an assemblage of shrubs and small trees. Conifer species often found in mixed conifer forest include white fir, Douglas fir, ponderosa pine, sugar pine, and incense cedar. Black oak, bush chinquapin, and canyon live oak are typical hardwood species. Mixed conifer forest is found in the Sierra Nevada from 2,700 to 4,000 feet in elevation in the north and from 4,000 to 10,000 feet in the south and in the Coast and Klamath ranges at elevations from 4,500 to 6,900 feet.

The structural complexity of mixed conifer communities makes them important for a variety of wildlife species. Conifers provide excellent nesting platforms for raptors, including northern goshawks and California and northern spotted owls. Woodpeckers, jays, crossbills, kinglets, and grouse are common. Mule deer, black bear, squirrels, voles, and chipmunks are common mammals that find forage and cover in coniferous forests. Common amphibian and reptile species include the black salamander, ensatina, garter snake, and Pacific treefrog.

MONTANE HARDWOOD

Montane hardwood vegetation typically consists of a well-defined tree layer composed predominantly of broad-leaved tree species. The shrub layer is usually poorly developed, with a sparse herb layer beneath. In dense stands, tree canopies may actually close but rarely overlap. A number of species are common in montane hardwood communities in the Sierra Nevada mountains and foothills: black oak, Pacific madrone, tan oak, interior live oak, and blue oak and foothill pine in the lower elevations. Elevations for

the community can vary from 300 feet near the Pacific Ocean to near 9,000 feet in northern California.

Montane hardwood habitat is used by a variety of reptiles, birds, and mammals. Acorns produced by oak trees provide forage for mule deer, black bears, squirrels, turkeys, jays, woodpeckers, and pigeons. Common amphibians and reptiles include ensatina, western fence lizard, sagebrush lizard, kingsnake, sharp-tailed snake, rubber boa, and western rattlesnake.

PINYON-JUNIPER

Pinyon-juniper vegetation is typically an open woodland of relatively low, bushy trees. The shrub layer may be dense or nearly absent, and herbaceous vegetation is typically fairly sparse. Dominant species in the southern Sierra Nevada and Transverse ranges include single-leaf pinyon, California juniper, Mormon tea, desert bitterbrush, rabbitbrush, and sagebrush. The pinyon-juniper community typically occurs on steep, rocky, or well-drained soils mostly outside the study area, in the Great Basin, Mojave Desert, and Peninsular ranges.

Pinyon seeds and juniper berries are important food sources for many wildlife species. Animals characteristic of this community include the pinyon mouse, bushy-tailed wood rat, pinyon jay, plain titmouse, and bushtit.

VALLEY FOOTHILL HARDWOOD

Valley foothill hardwood vegetation, which varies considerably depending on site conditions, is composed of three subtypes: valley oak woodland, blue oak woodland, and blue oak/foothill pine woodland. Valley foothill hardwood vegetation generally has a tree layer dominated by one or more species of oak. The shrub layer is often absent at lower elevations but consists of scattered clumps of several species at higher elevations. The herbaceous layer of all three subtypes consists mostly of non-native annual grasses and forbs.

The valley oak subtype varies from savannah-like, with an open canopy, to forest-like, with a nearly closed canopy at lower elevations and on sites with deep soils. Above the valley floor and on sites with shallower soils, blue oak intergrades with valley oak and becomes the dominant tree in the overstory. Generally, the blue oak subtype forms a woodland with scattered trees but, given favorable conditions, canopy closure may approach 100%.

Valley foothill hardwood habitat provides shade, shelter, nesting, and foraging habitat for many wildlife species. Studies indicate that hardwood ecosystems, such as oak woodlands, support a larger number of breeding wildlife species than any other nonriparian California woodland community (Mayer and Laudenslayer 1988).

The blue oak/foothill pine woodland subtype is found intergrading with blue oak woodland at higher elevations and is diverse both in structure and composition. Blue oak and foothill pine compose the overstory of this habitat, with blue oak being more abundant.

Primary cavity-nesting birds (such as acorn woodpecker) excavate nest holes in living and dead trees, and these cavities are subsequently used by other (secondary) cavity-nesting species, such as hawks, owls, flycatchers, nuthatch, titmouse, and bluebirds. Oak foliage and bark attract flycatchers, pewees, wrens, and vireos. The gopher snake, bullfrog, western toad, and Pacific tree frog are common. Other common species include raccoon, opossum, and woodrat.

CHAPARRAL

Chaparral is characterized by the presence of woody, often hard-leaved shrubs in a nearly impenetrable thicket. Shrub heights and densities range from 3 to 20 feet. Chaparral can be divided into three general types: montane, mixed, and chamise-redshank.

Montane chaparral varies from prostrate to tree-like forms, depending on site conditions. It generally occurs throughout the coniferous forest zone from 3,000 to 9,800 feet in elevation in northern California and above 7,000 feet in southern California. Species that characterize montane chaparral include snow bush, greenleaf manzanita, snowbrush ceanothus, pinemat manzanita, and bitter cherry.

Mixed chaparral generally occurs below 5,000 feet in elevation and usually forms dense, nearly impenetrable thickets with shrub cover approaching 80%. Scrub oak, ceanothus, and manzanitas are common mixed chaparral species.

At elevations below 4,000 feet and on drier sites, chamise-redshank chaparral becomes more common. Mature chamise-redshank chaparral is generally single layered with little or no herbaceous layer. Chamise-redshank chaparral often occurs as nearly pure stands of chamise or redshank, with the purest stands on the driest slopes. On more moist sites, toyon, sugar bush, poison oak, and spiny redberry are commonly associated with chamise.

Chaparral habitat lacks the structural diversity of forests and woodlands but provides forage and cover to a variety of wildlife. Common wildlife species are the brush rabbit, black-tailed deer, gray fox, western rattlesnake, and several species of birds, including California quail, wrentit, orange-crowned warbler, rufous-sided towhee, and California towhee.

COASTAL SCRUB

Coastal scrub is typified by low to moderately sized shrubs with soft leaves and flexible branches arising from a woody base. Coastal scrub is usually found within 20 miles of the ocean in the north and up to 50 miles from the ocean in the south. Elevations of coastal scrub range from sea level to nearly 3,000 feet.

Northern coastal scrub between Humboldt and San Mateo counties varies from a low patchy cover of nearly prostrate shrubs interspersed with grassland to a dense cover of shrubs, subshrubs, and perennial herbs, with shrubs reaching 7 feet in height. Bush lupine, many colored lupine, coyote brush, blue-blossom ceanothus, bush monkeyflower, poison oak, California sagebrush, and blackberry are common northern coastal scrub species.

Southern coastal scrub from about San Mateo County south is often called southern sage scrub because of the dominance of California sagebrush or various sage species. In wetter areas in southern coastal sage scrub, black sage and California buckwheat are codominants.

Common wildlife species occurring in coastal scrub include the western fence lizard, orange-crowned warbler, California thrasher, California quail, brush rabbit, Heermann's kangaroo rat, mule deer, gray fox, and coyote.

ALKALI DESERT SCRUB

Alkali desert scrub is generally characterized by a dominance of chenopods (members of the Goosefoot family) or other halophytes and is often thought of as existing in two distinct phases: xerophytic (drought-tolerant plants) and halophytic (salt-tolerant plants). In the study area, it occurs at low elevations in the western San Joaquin Valley.

The xerophytic phase is represented by open stands of widely spaced, low (0.8 foot) to moderately high (7 feet) grayish, spiny, and small-leaved shrubs and subshrubs. Allscale, fourwing saltbush, Parry saltbush, shadscale, and big saltbush are common shrubby saltbush species of this phase.

The halophytic phase is characterized by closely spaced, not very woody, and more or less succulent plants that tolerate periodic flooding. Common shrubs and subshrubs found in this phase include arrow weed, greasewood, alkali goldenbush, kochia, iodine bush, and alkali rubber rabbitbrush.

Common birds in the alkali desert scrub include roadrunners, mourning doves, blue-grey gnatcatchers, common ravens, sage sparrows, white-crowned sparrows, finches, and gold finches. Common mammals include pocket gophers, California ground squirrels, desert cottontail, deer mouse, voles, Heermann's kangaroo rat, hares, skunk, badger, and coyote. Reptiles, such as side-blotched lizards, western whiptails, western fence lizards, and western rattlesnakes are common.

DESERT SCRUB

Desert scrub vegetation is characterized by the presence of scattered assemblages of broad-leaved-evergreen or deciduous microphyllous shrubs usually less than 6.5 feet in height. Canopy cover from these shrubs is usually less than 50%, with bare ground often between plants.

Creosote bush is often considered the dominant plant in desert scrub probably because of its tall relative stature rather than its numbers. Other plants common to desert scrub are burro bush, bladderpod, desert agave, brittlebush, California barrel cactus, Engelmann's hedgehog cactus, desert globemallow, ocotillo, beavertail cactus, rubber rabbitbrush, and Mojave yucca. Scattered among the shrubs are forbs and grasses, such as basket evening primrose, galleta, big galleta, and bur-marigold.

Desert scrub is the most widespread vegetation in the Mojave and Colorado deserts and is generally found below 4,000 feet in elevation. Desert scrub provides habitat for a variety of wildlife species, especially reptiles and rodents. Typical species found in desert scrub include Couch's spadefoot toad, horned lizard, desert iguana, sidewinder, kingsnake, mice, kangaroo rat, coyote, bobcat, flycatcher, sparrow, Gambel's quail, and greater roadrunner.

SAGEBRUSH AND BITTERBRUSH SCRUB

Sagebrush and bitterbrush scrub vegetation is typified by large, open stands of big sagebrush or bitterbrush of fairly uniform height. Depending on site conditions, other species may become locally dominant. Sagebrush scrub vegetation occurs along the eastern and northeastern borders of California on dry slopes and flats from an elevation of about 1,600 to 10,500 feet.

Sagebrush and bitterbrush scrub provide foraging habitat for mule deer and pronghorn antelope and are a major winter-range type used by migrating deer. Sagebrush and bitterbrush scrub are essential habitat for nesting sage and blue grouse, sage thrasher, and sagebrush vole. Other common species include black-

tailed jackrabbit, cottontail rabbit, California ground squirrel, least chipmunk, woodrat, mice, kangaroo rat, pocket mice, coyote, bobcat, mountain lion, magpie, flycatcher, jay, hawk, owl, and falcon. Western fence lizard and rubber boa also reside in this plant community.

INLAND DUNES

Inland dunes (such as Antioch Dunes and Monvero Residual Dunes) are mostly dominated by herbaceous plants with a scattering of low shrubs or coast live oak. The low shrubs are usually less than waist high and provide less than 10% cover (Holland 1986). Plants characteristic of inland dune vegetation include California croton, California matchweed, telegraph weed, Contra Costa wallflower, and Antioch Dunes evening-primrose. Coyote, gray fox, striped skunk, deer mouse, red-tailed hawk, savannah sparrow, American pipit, horned lark, and western fence lizard are common wildlife species that occur in or visit inland dune habitats.

COASTAL BEACHES AND CLIFFS

The vegetation of coastal beaches and cliffs is exposed to a nearly continual, salt-laden, moist wind off the Pacific Ocean. Coastal beaches and their associated dunes are dominated by herbaceous plants, whereas cliffs are generally dominated by shrubs. When coastal beaches and dunes are vegetated, they are dominated by an assemblage of grasses, forbs, and small shrubs. Common plants occupying northern coastal beaches and dunes include European sea-rocket, coastal sand-verbena, beach-bur, European beachgrass, fig-marigold, beach morning glory, and beach rye grass.

Coastal cliffs are vegetated with low shrubs, herbaceous perennials, and annual grasses and forbs. Plants commonly encountered on northern coastal cliffs include yellow hairgrass, sea-pink, coast buckwheat, seaside daisy, lizard tail, many colored lupine, live-forever, and seaside plantain. Southern cliffs have plant species like those of the north, with the addition of saltbush, goldenbush, fig-marigold, and giant coreopsis. Coastal beach and cliff vegetation can be found from sea level to about 650 feet in elevation. Common wildlife species include shorebirds, seabirds, sparrows, squirrels, deer mouse, and red fox.

GRASSLAND

This community is characterized by a predominance of annual or perennial grasses forming an open grassland. Most of the grassland in California is dominated by naturalized annual grasses with perennial grasses existing in relictual prairies or on sites with conditions unfavorable for annual grasses, such as serpentine. Grassland vegetation as a whole has relatively high species diversity when compared to other California plant communities.

Annual grasses found in grassland vegetation include wild oat, soft chess, ripgut grass, medusa head, wild barley, red brome, and slender fescue. Perennial grasses found in grassland vegetation are purple needlegrass, Idaho fescue, and California oatgrass. Forbs commonly encountered in grassland vegetation include long-beaked filaree, redstem filaree, dove weed, clover, Mariposa lily, popcornflower, and California poppy. Vernal pools found in small depressions with an underlying impermeable layer are isolated wetlands within grassland vegetation. Vernal pools are discussed in further detail in the "Rare Natural Communities" section. Grassland vegetation occurs from sea level to about 3,900 feet in elevation.

Grassland communities are important foraging areas for hawks, falcons, yellow-billed magpie, loggershead shrike, sparrows, doves, blackbirds, and swallows. Birds such as killdeer, ring-necked

pheasant, western kingbird, western meadowlark, and horned lark nest in this plant community.

Grasslands also provide important foraging habitat for the coyote and badger because they support large populations of small prey species, such as the deer mouse, California vole, pocket gopher, and California ground squirrel. Common reptiles and amphibians of grassland habitats include western fence lizard, common kingsnake, western rattlesnake, gopher snake, common garter snake, western toad, and western spadefoot toad.

RUDERAL

Ruderal habitats are early successional communities and are created when farmed, developed, or disturbed sites are allowed to revert to a natural state. The plant species associated with ruderal habitats are site-specific and depend largely on past land use practices and surrounding habitats. (Madrone Associates 1980). The extent of use by wildlife is dependent on the type of vegetation present and adjacent land use. These habitats can support high populations of small mammals such as house mice, California voles, and pocket gophers. Mammalian predators include the gray fox, weasel, raccoon, and striped skunk. Common reptiles include the western fence lizard and gopher snake; if water is present, toads, Pacific treefrogs, and bullfrogs also may occur (Madrone Associates 1980).

BARREN AREAS

Barren areas are defined for the purpose of this report as sparsely vegetated or unvegetated lands. Within the study area, barren habitat occurs mostly in lava fields and other volcanic terrain. The sparse vegetation and wildlife in barren areas are generally representative of those in grassland, sagebrush, mixed conifer forest, or other habitats occurring on better developed soils nearby.

RIPARIAN COMMUNITIES

Riparian communities occur along creeks and rivers, and are found throughout the study area. These communities have adapted to wide yearly and seasonal fluctuations in flow volumes, an abundance of floodplain moisture, and a dynamic erosion-deposition cycle. Riparian communities are usually in a constant successional state because of the dynamic nature of topography and hydrology (Campbell and Green 1968). The resulting successional processes are responsible for the variation in structure (number of relative heights of vegetation layers) and species composition of vegetation types in riparian habitats.

Fluvial processes such as flooding, with its resulting sediment deposition and bank erosion, create three characteristic riparian landforms: gravel point bars, low terraces, and high terraces. Each landform has a different hydrology because of its physical relationship to the aquifer and flooding. Floods deposit nutrient-rich sediments that contribute to terrace formation by increasing elevations above the floodplain. Floods also break and abrade vegetation on gravel bars and low terraces, create anaerobic (without oxygen) soil conditions during flood events, erode riverbanks, and deposit entrained sediment on point bars.

Riparian vegetation is important because of its scarcity and resource values. This plant community supports several legally protected plant and animal species. Riparian habitats serve humans directly by forming a buffer between rivers and streams and intensively managed farmlands and urban landscapes, enhancing water quality through filtration of surface runoff, stabilizing streambanks, and moderating

floodflows (Murray et al. 1978, Brice 1977, and Groenveld and Gripentrog 1985).

Riparian communities typically support a great diversity of wildlife species because they present a unique combination of surface water and groundwater, fertile soils, high nutrient availability, and vegetation layering, all of which form a variety of microclimates (Warner 1979). For example, breeding birds restricted to riparian vegetation (obligates) may outnumber obligates of other habitats such as grasslands sevenfold (Tubbs 1980); at least 65 bird species are known to nest in riparian habitats of the Sacramento Valley (Gaines 1974). The linear nature of riparian corridors is another ecological factor responsible for the high species diversity and abundance in these habitats; the "edge effect" of transitions between two habitat zones such as riparian and annual grassland promotes greater wildlife diversity than in either habitat alone (Odum 1978).

Riparian communities are divided into seven subgroups. However, for the level of detail required in the impact analyses and natural community acreage tables, the following seven subcommunity descriptions are referred to simply as riparian.

VALLEY FOOTHILL RIPARIAN

Valley foothill riparian vegetation occurs in valleys and bottomlands bordered by gently sloping alluvial fans and dissected terraces and coastal plains. Valley foothill riparian vegetation generally consists of woodlands or forests of broad-leaved winter-deciduous hardwood trees as the overstory, with a variety of shrubs and vines composing the midstory, and a few grass and forb species in combination with vines composing the understory. The floodplains of valley foothill riparian communities are usually well developed.

WILLOW SCRUB/WILLOW-COTTONWOOD FOREST

Two vegetative communities, willow scrub and willow-cottonwood forests, develop on gravel bars. Gravel bar habitats are subject to seasonal flooding and are sensitive to changes in flow volumes, timing, and rates of change in flow volumes. Plant species that occur on gravel bars require coarse mineral substrates that are wetted during seed dispersal and during the establishment phase. Willow scrub vegetation is the "pioneering" vegetation in two topographic locations, point bars and creek edges, where dense thickets of one or more willow species (for example, sandbar, red, arroyo, black willow) develop, and canal slough banks and low river terraces, where dense willow thickets also contain small amounts of cottonwood, white alder, and mule fat, with occasional interior live oak and elderberry along the upper edges.

Willow-cottonwood forests form dense sapling stands or forests to 60 feet in height. Black willow, arroyo willow, and cottonwood dominate the canopy. Older stands typically have a midstory of willows and box elder or thickets of California wild grape, blackberry, and poison oak. Herbaceous vegetation can be sparse or dense and includes species such as cocklebur, mugwort, umbrella-sedge, and horseweed.

Wildlife species that forage on seeds and foliage in scrub and herb habitats along creeks and rivers include squirrel, gopher, vole, quail, dove, starling, goldfinch, and blackbird. Aquatic areas in the river channel provide foraging areas for carnivores and omnivores such as river otter, waterfowl, and gulls.

Unvegetated vertical banks along the rivers provide nesting substrates for a variety of specially adapted species. The bank swallow, belted kingfisher, northern rough-winged swallow, and owls depend on vertical banks for nesting.

Because willow scrub habitat frequently grows in dense clumps, it offers cover to a variety of wildlife species. Beavers preferentially feed on young willow shoots, and many small birds and mammals feed on willow seeds. Willows support an abundance of insect prey that feed on fresh foliage and stems during the growing season. These insects in turn support a high density and diversity of migratory and resident insectivorous birds and bats. Some species have declined or been eliminated from the valley floor as nesting species, among them the willow flycatcher, yellow warbler, and yellow-breasted chat (Remsen 1978).

MATURE COTTONWOOD RIPARIAN FOREST/ALDER-WILLOW FOREST

Mature cottonwood riparian forest/alder-willow forest habitats occurring on low terrace habitats develop as sediment accumulates on gravel bars and elevates them above the floodplain. Communities of this habitat are sensitive to floodplain water-level fluctuations and changes in flood intensity or duration. The communities are typically inundated only during floodflows.

Mature cottonwood forests develop from young-growth willow-cottonwood forests. Forest heights can exceed 100 feet with a canopy of cottonwood or cottonwood-black willow. A midstory of black willow, box elder, Oregon ash, and Northern California black walnut is typical of stands not choked by California wild grape, and a dense herb-vine growth often forms an impenetrable understory.

Alder-willow forests are primarily associated with canals, sloughs, and channelized rivers where steep gravel, rock, or riprap banks extend to the shoreline defined by sustained summer water levels. Alder-willow forests typically form narrow bands along the shoreline that often overhang the water. The 10- to 40-foot-tall canopy is dominated by white alder, arroyo willow, black willow, and red willow, with some Fremont cottonwood and Oregon ash. Higher adjacent ground supports other riparian communities.

Large trees in these forests provide habitat elements required by a number of wildlife species. Cottonwood trees provide adequate nesting support for larger birds such as hawks, owls, American crow, great egret, and great blue heron. Cavity-nesting species such as woodpeckers, wood duck, bats, western gray squirrel, raccoon, and ringtail require mature stands. The typically narrow, linear nature of the alder-willow forest favors forms of wildlife that forage in adjacent herbland or agricultural habitats, including black-shouldered kite, American kestrel, and western kingbird. It also provides perches and cover for species that forage in or over the water, including double-crested cormorant, green-backed heron, belted kingfisher, violet-green swallow, tree swallow, black phoebe, beaver, river otter, and various bat species.

MIXED RIPARIAN HERB/SCRUB

The mixed riparian herb/scrub community is located on riverbanks, berms, and terraces; this vegetation occupies sites where disturbance from levee maintenance and farming practices prevents the development of mature riparian forests. Herbaceous dominants include weedy annual grasses, sedges, rushes, and numerous forbs, such as horsetails, mustards, and thistles. The scrub layer consists of shrub, vine, and tree saplings of willow, mule fat, blackberry, California wild grape, California wild rose, box elder, Fremont cottonwood, and Oregon ash. Riparian herb/scrub is associated with banks protected from erosion by riprap and levees, channel islands, and natural berms that are not protected by riprap, such as those found at the margins of some Delta islands, and with unmaintained agricultural ditches in the interior of Delta islands. Riparian herb/scrub habitats typically are disturbed periodically for levee maintenance. In the absence of disturbance or frequent inundation from highest tides, most sites supporting riparian scrub in the Delta area, for example, would eventually develop into riparian woodland (Madrone Associates 1980).

The mixed riparian scrub community provides a variety of resources used by wildlife. Many plants in this habitat produce fruits that are important to wildlife. Common wildlife species in mixed scrub areas include those dependent on nectar, fruits, and seeds, such as Anna's hummingbird, sparrow, finch, scrub jay, black-headed grosbeak, lazuli bunting, rufous-sided towhee, Virginia opossum, raccoon, striped skunk, and gray fox. The mixed scrub habitat also supports many insectivorous bird species.

MIXED RIPARIAN FOREST/VALLEY OAK RIPARIAN FOREST

Mixed riparian forest and valley oak riparian forest typify high terrace riparian communities. High terrace habitats are inundated during peak storm runoff events only and are not subject to severe physical battering or erosion (aside from bank erosion) or long-term flooding. Mixed riparian forests develop from mature cottonwood forests as terrace elevations increase and cottonwoods senesce and die, thereby "releasing" midstory trees from the inhibition of overstory shading. This community is characterized by lush, multilayered 150-foot-tall gallery forests. The canopy includes Fremont cottonwood, western sycamore, Oregon ash, Northern California black walnut, and valley oak. Midstories include black willow, box elder, and young trees of canopy species. Shrub understories include often-impenetrable vine thickets of California wild grape, blackberry, poison oak, California wild rose, and California pipestem clematis. These vines drape over the midstory and canopy layers, imparting a jungle-like appearance. Herb layers are typically dense.

Mixed riparian forests support the densest and most diverse wildlife communities in the Central Valley. The diversity of plant species and growth forms provide a variety of foods and microhabitat conditions for wildlife. Many of the mixed riparian plants provide valuable fruits, nuts, or seeds. Wildlife present include most of the species that occur in cottonwood forest and riparian scrub habitats. Oaks and walnuts support certain species that infrequently occur in the other habitats, such as acorn woodpecker, plain titmouse, white-breasted nuthatch, and western gray squirrel.

Valley oak riparian forests develop on the highest terraces where flooding is least frequent and short in duration. Valley oak riparian forest develops from mixed riparian forests where dense California wild grape vines have not prevented establishment of oak seedlings. The sparse-to-dense canopy consists of valley oak occasionally interspersed with Northern California black walnut. The sparse midstory consists of tree saplings, California wild grape, poison oak, blue elderberry, and blackberry. A lush grass or sedge-dominated herbaceous layer is typical.

Oak forests provide nesting sites for hawks, herons, and egrets that require sturdy nesting sites and an open canopy for easy nest access. Valley oak stands also provide the best habitat for the acorn woodpecker, plain titmouse, and western gray squirrel. The open oak canopy provides perch sites for aerial foraging species such as the Lewis' woodpecker, ash-throated flycatcher, and western wood-pewee. It also offers perch sites for species that search for prey on the ground, such as the western bluebird and northern flicker. The furrowed bark on older oaks provides foraging habitat for species, such as the Nuttall's woodpecker and white-breasted nuthatch, that probe and peck for insects.

RIPARIAN WOODLAND

Riparian woodlands typically occur along unmaintained, narrow channelbanks (DWR 1994). Common overstory tree species in riparian woodlands include Fremont cottonwood, western sycamore, white alder, valley oak, box elder, ash, and several willow shrub and tree species. Typical understory and midstory species include blackberry, buttonbush, wild rose, and mugwort. The species composition and structure of riparian woodlands in the Delta Region vary widely depending on stand age, soil type,

disturbance factors, and elevation above sea level (Madrone Associates 1980).

Riparian woodland supports the greatest diversity of bird species in California. The combination of the multilayered woodland canopy structure, groundcover, understory vegetation, presence of snags, and proximity to water provides the habitat elements required by many species (Madrone Associates 1980). Tree snags provide cavities for hole-nesting species such as woodpeckers, tree swallows, and wood ducks. Insects in and adjacent to the canopy provide forage for flycatchers and vireos, and species such as nuthatches and titmice glean insects from bark surfaces. Tall trees found in woodlands provide nest sites for high-canopy nesters, including great blue herons and several raptor species (Madrone Associates 1980).

Ground litter accumulates beneath the canopy and provides habitat for insects and other invertebrates, reptiles and amphibians, and small mammals that are prey species for predators such as bats, raccoons, skunks, and minks. Fruits of riparian vegetation, including acorns, rose hips, and berries, are important seasonal food sources for herbivorous and omnivorous species (Madrone Associates 1980).

MONTANE RIPARIAN

The riparian communities of mountainous (montane) areas differ from valley foothill communities in extent and composition because the floodplain is constricted to narrow canyon bottoms, which limits river meandering and the lateral extent of the floodplain aquifer.

Because of the narrow floodplain, montane riparian vegetation is confined to a narrow band along the water's edge and to low terraces and gravel bars in the channel. The multilayered vegetation is nearly continuous along the bank, with Fremont cottonwood, white alder, willows, western sycamore, valley oak, and Oregon ash prevailing as common canopy species. A relatively dense shrub layer of willows, buttonbush, spicebush, creek dogwood, mule fat, and poison oak is typical. Because it is near woodlands and forests, dogwood, bigleaf maple, canyon live oak, Douglas fir, and incense cedar are often intermixed.

Narrow bands of montane riparian habitat provide valuable wildlife habitat despite their small areal extent. These areas are typically cooler, moister, and more productive than surrounding habitats.

Insectivorous species occurring in these habitats include vireos, warblers, and a variety of shrew species. Herbivores and omnivores that frequent streamside vegetation include towhees, fox sparrows, black-tailed deer, and western gray squirrels.

WETLAND COMMUNITIES

Wetland communities develop in the presence of hydrologic conditions that create seasonal or year-round inundation or saturated soils. They are also characterized by specific vegetation types and nonoxidizing soils. Wetland communities are important because they provide habitat for dependent plant and wildlife species and because they are scarce. Each wetland community type is adapted to specific hydrologic situations and is, therefore, sensitive to changes in water-table elevations. Two broad categories of wetland communities occur in the study area: freshwater emergent wetlands (permanent, seasonal, and managed types) and saline emergent wetlands. Open-water and tidal flat communities are generally unvegetated but are associated with wetland communities and are also described under the wetland community type.

FRESHWATER EMERGENT WETLANDS

Freshwater emergent wetlands are characterized by the presence of erect, rooted, herbaceous plants that require or are tolerant of saturated or flooded soils. Freshwater emergent wetlands are inundated or saturated for a sufficient period to create anaerobic conditions in the root zone. Vegetation in these wetlands can vary from small isolated clumps in a body of water to large uninterrupted expanses covering many acres. Three types of freshwater emergent wetlands are described below: freshwater marshes, vernal pools, and managed wetlands; however, these subgroups are combined as one community type in the natural community acreage table and in the impact analysis.

Freshwater Marshes (Permanent Wetlands)

Freshwater marshes (permanent wetlands) develop where fine-textured sandy and silty soils are permanently inundated or saturated. The community is intolerant of quickly flowing water, water depths exceeding 5 feet, rapid or wide fluctuations in water level, and saltwater. This community is restricted to ponds, canals, sloughs, river backwaters, and similar habitats.

Freshwater marshes in the study region are dominated by dense growths of tule and cattail, with occasional verbena, smartweed, rose mallow (California hibiscus), and various rush and sedge species. Open water in and near freshwater marshes and along rivers, oxbows, and quiet backwaters is dominated by floating and submerged aquatic species including pondweed, water-milfoil, waterweed, duckweed, bladderwort, and waterlily. Freshwater marshes provide important habitat for waterfowl and a variety of other wildlife species, including grebe, heron, egret, bittern, coot, shorebirds, rail, hawk, owl, muskrat, raccoon, opossum, and beaver. Many other upland species such as ring-necked pheasant, California quail, black-tailed hare, and desert cottontail take cover and forage at the margins of wetland habitats. Many reptiles and amphibians such as common garter snake, aquatic garter snake, Pacific treefrog, and bullfrog also breed and feed in freshwater habitats of the region.

Many wildlife species associated with saline emergent marshes also use freshwater marshes. Permanent freshwater marshes provide habitat for a great diversity of wildlife, and the density of emergent vegetation is a major determinant of species use. Dense stands of tule and cattail provide cover and nesting habitat for the American coot, pied-billed grebe, several species of rails, long-billed marsh wren, and common yellowthroat. More open stands of tule and cattail, in association with open water and mudflats, provide foraging habitat for shorebirds, wading birds, and waterfowl. Songbirds nest, forage, and find cover in willows and other marsh-associated shrubs. Beavers and muskrats are common aquatic mammals associated with marshes, and California voles and other small mammals are associated with areas of higher elevation within and adjacent to marshes (Madrone Associates 1980).

Vernal Pools (Seasonal Wetlands)

Vernal pools (seasonal wetlands) develop in shallow basins that form in flat-to-hummocky terrain. Soil durapans underlying the basins prevent water infiltration and the nearly level terrain inhibits surface runoff. Saturated soil conditions cause the water table to become exposed because it is "perched" on the durapan. Hence, surface water accumulates in the basins, forming a seasonal wetland.

Vernal pools are important communities because of their current scarcity. Holland (1978) estimated that 5 to 30% of California's vernal pools are intact today; the figure for the Central Valley is about 5%. They support an ephemeral flora dominated by terrestrial/endemic annual species, with perennial and aquatic species often contributing significant cover. Vernal pool species flower throughout the spring, resulting

in conspicuous zonation patterns formed by consecutively blooming species around drying pool margins. Characteristic dominant plants include popcornflower, low barley, downingia, coyote-thistle, goldfield, meadowfoam, owl's clover, pogogyne, woolly marble, and navarretia. Many of these plant species are endemic and specialized to vernal pools.

Although vernal pools are an ephemeral aquatic habitat, invertebrates and amphibians also have adapted to and, in some cases, are endemic and specialized to this resource. When standing water is available, California tiger salamander, western spadefoot toad, and Pacific treefrog may use the pools for egg-laying and for the development of young. Aquatic invertebrates, such as fairy shrimp, tadpole shrimp, clam shrimp, cladoceran, copepod, and crawling water beetle, also may inhabit vernal pools. In winter and spring, waterbirds may use vernal pools for resting and foraging grounds. Kingbirds and phoebes feed on flying insects above vernal pools.

Managed Wetlands (Seasonal/Permanent Wetlands)

Managed wetlands (seasonal/permanent wetlands) are used on federal and state refuges to maximize habitat suitability for waterfowl and other wetland-dependent wildlife. Managed wetlands can be broadly categorized into permanent wetlands, semipermanent wetlands, seasonal wetlands, and moist soil plant areas.

Permanent wetlands are flooded throughout the year, with periodic drainage to control emergent vegetation and increase productivity. Water is maintained at a depth from 30 to 48 inches. Dominant vegetation includes cattails, tules, and pondweeds. Semipermanent wetlands are frequently the low portions of seasonal wetlands that remain flooded after seasonal wetlands have dried or are drained. This type of wetland management maintains water on the site for 8 to 12 months annually and provides important summer water and brood ponds for resident waterfowl, sandhill cranes, and shorebirds, and foraging habitat for wading birds, other waterbirds, and raptors. Common mammals associated with managed/seasonal wetlands include, for example, the California vole, striped skunk, and coyote (USFWS 1992). Seasonal wetlands are flooded in fall and maintained through winter or spring but are drained or allowed to dry through summer.

Moist soil plant areas are seasonal wetlands managed for high production of preferred waterfowl forage plants and invertebrates. These areas may be irrigated during summer to stimulate plant growth. Water regimes are selected for specific plant associations, including swamp timothy, watergrass, or smartweed.

SALINE EMERGENT WETLANDS

Saline emergent wetland vegetation is dominated by water-seeking vegetation living in brackish or saline waters or soils. Vegetation is mostly composed of perennial grass-like plants and forbs. Forbs in saline emergent vegetation are usually succulent and not very woody. Mats of algae often carpet moist soils and plant stems. Component plants are present in zones or patches relating to elevational gradients above the mean water level, and vegetative cover is generally complete except where creeks or ponds exist.

Characteristic species of lower, and consequently more saline, sites are cord grass, pickleweed, saltwort, fleshy jaumea, California sea-blite, and alkali heath. Typical species of more brackish sites include bird's-beak, sea-lavender, African brass-buttons, saltmarsh dodder, tules, slender cattail, silverweed, and slough sedge. Saline emergent wetland vegetation occurring in the upper intertidal zone (from about mean lower high water to extreme high water) is about 10 feet above mean lower low water and includes some freshwater-tolerant species.

Saline emergent wetlands provide habitat for approximately 200 species of birds, mammals, reptiles, and amphibians (Corps 1994). Birds that commonly use this habitat include salt marsh yellowthroat, song sparrow, marsh wren, Virginia rail, American coot, and shorebirds, including duck, heron, egret, and swallow, and resident and migratory waterfowl. Raccoon, opossum, striped skunk, red fox, and coyote forage along the edges of saline emergent wetlands.

Saline emergent wetlands are frequently diked, as observed most frequently in the Suisun Bay/Marsh.

OPEN WATER

Open-water areas include river channels, lakes, reservoirs, estuaries, sloughs, flooded islands, ponds, and bays. Deep open-water areas are largely unvegetated; beds of aquatic plants occasionally occur in shallower open-water areas. Typical aquatic plant species include water hyacinth (a non-native noxious weed), water milfoil, and yellow water weed. (DWR 1994). Gulls, terns, kingfishers, ospreys, and bald eagles hunt for fish and invertebrates in open water. Insectivorous birds and bats feed over open water. Common mammals in open water include muskrats, beavers, and river otters (Mayer and Laudenslayer 1988). This habitat provides resting and foraging areas for diving ducks, gulls, grebes, and other open waterbirds.

TIDAL FLATS

Tidal flats include shoals, sandy mud bars, and portions of streambeds that are exposed at low tide. Tidal flats are largely unvegetated, although some emergent vegetation may be present. Exposed tidal flats provide resting and foraging habitat for several bird groups. Gulls use tidal flats as resting areas during spring and fall migration, and large numbers of shorebirds congregate to forage on invertebrates on the tidal flat substrate. Mammals such as raccoons and skunks also forage along tidal flats (Madrone Associates 1980, USFWS 1992).

RESERVOIR HABITATS

Reservoirs created for the storage of water also provide habitat for wildlife, primarily waterbirds (for example, gulls, waterfowl, wading birds, shorebirds, and coots and rails) during fall and winter. Most reservoirs are not optimum habitat because frequently fluctuating water levels do not allow establishment of vegetation along shorelines, and steep sides limit the amount of shallow-water habitat preferred by most species of waterbirds for resting, foraging, and nesting. Reservoir habitat includes three distinct zones: shoreline, shallow water, and open water.

Shoreline habitat includes the area above and below the high-water level. The habitat above the high-water level is the natural habitat that occurred in the area before inundation of the reservoir. Common habitats around reservoirs are mixed conifer forest, montane hardwood, valley foothill hardwood, chaparral, and grassland. These habitats were described in a previous section. The other portion of shoreline habitat occurs in the area between the high- and low-water elevations. The amount of shoreline varies in a year as the reservoir fills during winter and spring and is drained during summer and fall. The fluctuating water levels result in constant erosion and extended periods of inundation and exposure that inhibit the establishment of vegetation. Furthermore, the native soil is generally eroded by wave action and fluctuating water levels. Common vegetation along the shoreline may be ruderal annual forbs and grasses. Some reservoirs developed moderate amounts of willow scrub vegetation in their drawdown

zones during the dry years from 1987 to 1993 (for example, Folsom Lake contains scattered small patches of Goodding's black willow totaling approximately 65 acres).

Shorelines tend to have low value for most wildlife species because generally no vegetation exists to provide forage and cover for wildlife. Shorelines are used by small numbers of shorebirds, wading birds, dabbling ducks, and American coots that feed on invertebrates, herbaceous vegetation, or seeds scattered along the shoreline. Additional species include raccoon, striped skunk, coyote, and Pacific treefrog.

Shallow-water wildlife habitat in a reservoir is the area with less than 1 foot of water. The extent of this habitat is generally limited because of the steep sides of most reservoirs. Vegetation is adapted to grow in an oxygen-deficient habitat. Plants such as milfoils and waterweeds become evident late in the growing season after drawdowns in the reservoirs have begun. Emergent aquatic plants, such as cattails, and tules, may establish in some shallow-water areas, but this vegetation rarely persists because of the variations in water levels. Shallow-water habitat is optimal foraging depth for dabbling ducks, coots, and wading birds. These animals feed on aquatic invertebrates, small fish, amphibians, and aquatic plants. Shallow-water shorelines may also be used by muskrats, raccoons, and skunks.

Open-water wildlife habitat is any portion of the water that is deeper than 1 foot. This habitat is generally devoid of vegetation because of the lack of oxygen, light, and cold temperatures that limit the photosynthesis capabilities of plants. This habitat provides resting and foraging areas for diving ducks, gulls, grebes, and other waterbirds.

AGRICULTURAL LANDS

Although natural communities provide the highest value for wildlife, many of these natural habitats have been replaced by agricultural habitats with varying benefits to wildlife. Six agricultural types were identified in the study area: pasture, orchard/vineyard, row crops, grain, rice, and cotton. The intensive management of agricultural lands, including discing, grazing, crop rotation, and the use of chemicals, reduces the value of these habitats for wildlife. However, many wildlife species have adapted to particular crop types and now use them for foraging and nesting. Compared to other agricultural crops, rice and grain crops are considered of high value for wildlife because of the importance of waste grain to foraging wildlife species, and flooded rice fields provide habitat similar to some natural wetlands. In contrast to rice and grains, pasture and row crops provide moderate-quality habitat because of limited cover and foraging opportunities. Orchard/vineyard and cotton crops provide low-quality wildlife habitat because of frequent disturbance, resulting in limited foraging opportunities, and lack of cover. Table 2 (in the technical report) summarizes the acreage of natural communities and agricultural crops in study area regions.

PASTURE

Pastures consist of irrigated and nonirrigated lands that are dominated by grasses and legumes. The vegetation composition of pastures varies with management practices, affecting the abundance and composition of wildlife resources. Native wildlife species utilize irrigated pasture as a wetland resource; however, the frequent harvesting reduces habitat quality for ground-nesting wildlife. Irrigated pastures also provide foraging and roosting opportunities for many shorebirds and wading birds. Lightly grazed, nonirrigated pastures may have value similar to that of annual and perennial grasslands, providing forage for seed-eating birds and small mammals when the seeds ripen. Alfalfa grown in irrigated pastures provides high-quality foraging habitat for rodents.

Small mammals occupying pasture habitat include California vole, Botta's pocket gopher, and California ground squirrel. Raptors are common and prey upon rodents. Areas where alfalfa or wild oats have been recently harvested provide high-quality foraging habitat for raptors. Ground-nesting birds, such as ring-necked pheasant, waterfowl, and western meadowlark, occupy pasture habitat if adequate residual vegetation is present.

ORCHARD/VINEYARD

Orchard/vineyard habitat consists of cultivated fruit or nut-bearing trees and grape vines. This habitat is planted in a uniform pattern and intensively managed. Understory vegetation is usually sparse; however, in some areas, grasses are allowed to grow between vineyard rows to reduce erosion. Wildlife species associated with vineyards include the deer mouse, mourning dove, and black-tailed hare. The nut crop from orchards provides feed for the American crow, scrub jay, northern flicker, Lewis' woodpecker, and California ground squirrel. The fruit crops from orchards provide additional food for the yellow-billed magpie, American robin, northern mockingbird, black-headed grosbeak, gray squirrel, raccoon, and mule deer. For the most part, this habitat provides only limited foraging opportunities and very little roosting or breeding habitat.

ROW CROPS

Row crops include tomatoes, broccoli, artichokes, lettuce, sugar beets, and strawberries. Intensive management and the use of chemicals to control pests in row crops greatly limit their use by wildlife. Rodent species that forage in row crops include the California vole, deer mouse, and California ground squirrel. These rodent populations are preyed upon by hawks and kites.

GRAIN

Grain crops include barley, wheat, corn, and oats. Many of these crops are planted in fall and harvested in spring. Grain crops are intensively managed, and chemicals are often used to control pests and diseases. This management strategy reduces their value to wildlife; however, the young green shoots of these crops provide important foraging opportunities for such species as greater white fronted geese, tundra swans, wild pigs, and tule elk. Other species, including blackbirds, pheasants, waterfowl, and western harvest mice, feed on the seeds produced by these plants.

RICE

Cultivated rice in the study area has some of the attributes found in seasonal wetlands; however, the intensive management of this habitat reduces many of the benefits found in natural wetlands. Flooded rice fields provide nesting and foraging habitat for waterfowl and shorebirds. The grain produced by this crop provides important forage for many wildlife species. After harvest, waste grain is fed upon by waterfowl, California voles, and deer mice. Raptors feed upon rodents in this habitat. Irrigation ditches used to flood rice fields often contain dense cattail vegetation. These ditches provide habitat for wildlife species, such as Virginia rails, American bitterns, egrets, marsh wrens, common yellowthroats, and sparrows. Irrigation ditches are routinely cleared of vegetation; therefore, the habitat provided is temporary.

COTTON

Cotton is of limited value to wildlife because of the intensive management of this crop and the use of

chemicals to control pests and disease. Mourning doves and house mice are found in this crop type. During irrigation, when vegetation is short and sparse, additional wildlife, including killdeer, American pipet, and horned lark, may be attracted.

RARE NATURAL COMMUNITIES

The following descriptions, based on Holland (1986) and CNPS (Sawyer and Keeler-Wolf 1995), focus on rare natural communities that occur in the study area regions.

VALLEY OAK WOODLAND

Valley oak woodland is an open-canopied community dominated almost exclusively by valley oak. Valley oak is California's largest broad-leaved tree, attaining heights from 50 to 115 feet. An herbaceous understory exists and few shrubs, if any, are present.

Valley oak woodland occurs in the Sacramento and San Joaquin valleys adjacent to the Sierra Nevada foothills and in the valleys of the Coast Ranges from Lake County to western Los Angeles County. This community is found at elevations from sea level to 2,540 feet, occurring in all the study area regions except the Delta and Bay. Large areas of this community have been eliminated by woodcutting and conversion of habitat to agricultural and urban lands.

VALLEY OAK RIPARIAN FOREST

This community is similar to the valley oak woodland community described earlier, but it is characterized by a closed canopy dominated primarily by valley oak. Valley oak riparian forest is restricted to higher sections of floodplains that are away from the active river channels, yet still receive annual inputs of silty alluvium and have a shallow-water table.

Once extensive along the major streams of the Sacramento and northern San Joaquin valleys, this community has suffered extensive losses because of conversion to agriculture and harvesting of firewood. Valley oak riparian forest occurs in all of the study area regions, except the Bay Region.

FREMONT COTTONWOOD RIPARIAN FOREST

This community is similar to the valley oak riparian forest community but is characterized by a dense tree layer codominated by Fremont cottonwood and black willow. It occurs on sites along perennial or nearly perennial streams that receive frequent flooding. These sites are inundated during winter and spring and receive subsurface irrigation from a shallow-water table during the remainder of the year.

Historically abundant along major streams throughout the Central Valley, Fremont cottonwood riparian forest now occurs only in small, scattered, isolated patches. Major losses to this community have resulted from flood control, water diversion, agricultural development, and urban expansion. It occurs in all regions of the study area except the Bay Region.

MIXED RIPARIAN FOREST

This community is similar to the riparian forest communities described earlier. It is a closed-canopy

forest dominated by any of several species, including box elder, northern California black walnut, western sycamore, Fremont cottonwood, black willow, yellow willow, and red willow. Mixed riparian forest occurs on relatively fine-textured alluvium slightly back from the active river channel. Overbank flooding usually occurs annually. This community may intergrade with Fremont cottonwood riparian forest closer to the river channel and valley oak riparian forest farther from the river.

Mixed riparian forest is found most abundantly along low-gradient streams throughout the Sacramento and San Joaquin valleys. Clearing for agriculture, flood control, and urban expansion has severely reduced the abundance of this community. Mixed riparian forest occurs in all of the study area regions except the Bay Region.

SYCAMORE ALLUVIAL WOODLAND

Sycamore alluvial woodland is a broad-leaved riparian woodland community dominated by moderately spaced western sycamore trees.

California buckeye and blue elderberry are common components of the subcanopy. An understory of annual grasses and mule fat is typical.

Sycamore alluvial woodland is found along braided, depositional channels of intermittent streams that are usually characterized by cobbly or boulder substrates. This community is found in the San Joaquin River Region.

GREAT VALLEY WILLOW SCRUB

Great Valley willow scrub is an open to dense streamside community that forms a shrubby thicket dominated by any of several willow species. An herbaceous understory of naturalized and native annual grasses and forbs exists in more open-canopied stands.

Great Valley willow scrub occurs along the major rivers and many smaller streams in the Central Valley, typically below 1,000 feet. It has the potential to occur in the Sacramento River, San Joaquin River, and Delta regions.

GREAT VALLEY MESQUITE SCRUB

This community is an open woodland or savanna dominated by mesquite, phreatophyte (a plant that sends roots down to the water table), and allscale. An understory of naturalized annual grasses is typical. Great Valley mesquite scrub occurs on sandy loam soils in areas with hot, dry summers and moist, foggy winters.

This community was once common in the southern San Joaquin Valley from Bakersfield to the inner South Coast Range at Tupman and Buena Vista Lake. The NDDB also cites this community as occurring farther north. It has been virtually extirpated by flood control, agricultural development, and groundwater pumping. Great Valley mesquite scrub occurs in the San Joaquin River Region.

ELDERBERRY SAVANNA

Elderberry savanna is a community of early successional stages dominated by open stands of blue elderberry. The understory is characterized by naturalized annual grasses and forbs. This community

occurs on deep alluvial soils removed from the active river channel and is subject to occasional flooding during high rainfall events.

Elderberry savanna is patchily distributed among riparian stands throughout the Sacramento River and northern San Joaquin River regions, as far south as Merced County.

IONE CHAPARRAL

This community is characterized by Ione manzanita as the sole or dominant shrub in the canopy layer. Occasional trees, such as canyon live oak or foothill pine, are present. Other associates of the shrub layer include deer weed, scrub oak, and sticky whiteleaf manzanita. Only a sparse ground layer exists.

Ione chaparral is restricted to the foothills of Amador and Calaveras counties, in the Sacramento River and San Joaquin River regions.

VALLEY SINK SCRUB

This succulent shrubland community is dominated by alkali-tolerant species, such as iodine bush and bush seepweed. Soft chess and other annuals may sparsely vegetate the understory.

Valley sink scrub occurs on heavy saline or alkaline clay soils of lakebeds or playas with high groundwater supplies in the Central Valley. It once surrounded the San Joaquin Valley lakes and was prevalent around water bodies in the Sacramento Valley. This community has been virtually extirpated by flood control, agricultural conversion, and groundwater pumping. Valley sink scrub occurs in the San Joaquin River Region.

STABILIZED INTERIOR DUNES

This is an open community characterized by a scattering of annual and perennial herbs, grasses, and low-growing shrubs. Common species include Antioch Dunes evening-primrose, California croton, California matchweed, Contra Costa wallflower, auriculed barestem buckwheat, and telegraph weed. Individuals of coast live oak may also be present.

Stabilized interior dunes form a riverbank community occurring on the lower reaches of the San Joaquin River at Antioch. The dunes were formed from glacial outwash of the Pleistocene Sierra Nevada. Historically very limited, this community has been further reduced by agricultural and industrial development, road building, and sand quarrying. Stabilized interior dunes occur in the Delta Region.

MONVERO RESIDUAL DUNES

This open community is dominated by two shrubs: desert tea and narrowleaf goldenbush. An understory of grasses, such as desert needlegrass and Indian ricegrass, and several forbs characteristic of the Colorado and Mojave deserts occur in the Monvero residual dunes.

This community is found on hilltop sand accumulations that have weathered in place from Miocene sandstones. It is restricted to the lower inner south Coast Range in western Fresno County, from approximately 1,500 to 3,000 feet in elevation. Monvero residual dunes occur on the western side of the San Joaquin River Region.

VALLEY NEEDLEGRASS GRASSLAND

This community is dominated by the tussock-forming purple needlegrass; naturalized annual forbs and grasses also are common. It is found on fine-textured soils that receive ample water during winter. This community is much reduced in its historical range, which includes the Sacramento, San Joaquin, and Salinas valleys and the Los Angeles Basin. Valley needlegrass grassland occurs in the study area regions.

SERPENTINE BUNCHGRASS GRASSLAND

Serpentine bunchgrass grassland is a perennial bunchgrass community dominated by several native grasses and forbs, such as foothill needlegrass, nodding needlegrass, California melic grass, California lotus, and California poppy. It is restricted to serpentine sites primarily in the Coast Ranges but also is found in limited extent in the Sierra Nevada and southern California mountains. Serpentine bunchgrass grassland also occurs in the Sacramento River and Bay regions.

VALLEY SACATON GRASSLAND

This tussock-forming community is dominated by alkali sacaton. It occurs on fine-textured, poorly drained alkaline soils. Seasonally high water tables are typical in this community. Once extensive in the San Joaquin Valley north to Stanislaus and Contra Costa counties, this community is now much reduced. Valley sacaton grassland occurs in the San Joaquin River Region.

WILDFLOWER FIELD

Wildflower field is a herbaceous community with a conspicuous display of any number of wildflower species, such as California poppy, bicolored gilia, tidy tips, bicolored lupine, and owl's clovers. Wildflower field is found in the valleys and foothills of most of the California Floristic Province, generally the area west of the Pacific divide possessing a Mediterranean-type climate. This community occurs below 2,000 feet in elevation in the north and from about 4,000 to 5,000 feet in the south and is found in the Sacramento River, San Joaquin River, and Delta regions.

VERNAL POOL

Vernal pools are shallow, seasonal water bodies that accumulate water during winter and spring because of the presence of an impermeable subsurface layer. Annual herbs bloom after water evaporates in late spring. Species composition varies among pools, but may include downingia, coyote-thistle, goldfield, popcornflower, and woolly marble.

Vernal pools occur in the Central Valley, southern central coast, south coast, and Modoc Plateau of California from sea level to 3,610 feet. They also occur in the Sacramento River and San Joaquin River regions.

NORTHERN CLAYPAN VERNAL POOL

Northern claypan vernal pools are similar to the vernal pool habitat described above. They are shallow, seasonal water bodies that accumulate water during winter and spring because of very acidic, cemented hardpan soils. Species composition varies, often including popcornflower, goldfield, alkali weed, alkali heath, and button celery. Soils are often more or less saline, and occur on lower terraces and basin rims in the Bay Region.

COASTAL AND VALLEY FRESHWATER MARSH

This wetland community occurs on permanently flooded sites with slow-moving freshwater, where deep, peaty soils tend to accumulate. It is dominated by densely spaced perennial, emergent grass-like plants. Bulrushes and cattails dominate individually or together.

Coastal and valley freshwater marsh is extensive in the upper Delta and common in the Sacramento and San Joaquin valleys in floodplain areas such as river oxbows. It also occurs along the fringes of perennially flooded drainage ditches, canals, ponds, and lakes and in coastal valleys near river mouths. This community is found in the Sacramento River, San Joaquin River, and Delta regions.

CISMONTANE ALKALI MARSH

This community is characterized by densely spaced perennial emergent plants, including saltgrass and rushes. Soils are perennially inundated or saturated and are alkaline because of high evaporative pressures and low freshwater inputs. Cismontane alkali marsh occurs along lakebeds and other floodplains of the Sacramento River, and San Joaquin River, and Delta regions.

ALKALI MEADOW AND SEEP

These communities are composed of perennial grasses, sedges, or herbs. Species richness is typically low and may include plants, such as alkali sacaton, saltgrass, ditchgrass, and rushes. Sites supporting alkali meadows and seeps are more or less permanently moist and are characterized by alkaline or saline soils.

Alkali seeps are found primarily in the desert regions of California and less commonly in other areas. Alkali meadows occur mainly in valley bottoms and on the lower portions of alluvial slopes from 3,500 to 7,000 feet, they also are scattered throughout the California Floristic Province (Hickman 1993). Alkali meadows and seeps occur throughout the Central Valley in the Sacramento River and San Joaquin River regions.

BOGS AND FENS

Bogs are characterized by a dense growth of herbaceous perennials and low-growing shrubs. Fens are similar to bogs, but with a richer flora that includes larger shrubs. Common species may include sedges, roundleaf sundew, California pitcher plant, Labrador tea, Douglas' false-willow, and sphagnum moss.

Bogs are found scattered in the Klamath and Coast ranges, the Sierra Nevada, and the Cascade Range. They inhabit cold, acidic, poorly drained, low-nutrient areas. NDDB occurrences of bogs and fens have been reported for the Sacramento River Region and the eastern side of the San Joaquin River Region.

COASTAL BRACKISH MARSH

Coastal brackish marsh is similar to coastal and valley freshwater marsh with the addition of species, such as saltgrass and pickleweed, that are more tolerant of higher salinities. Salinities tend to vary considerably with changes in the tide.

This community typically occurs at the interior of coastal bays and estuaries where freshwater and saltwater intermix, and in coastal lagoons. It is well developed at Suisun Bay. Coastal brackish marsh is found in the western side of the Sacramento River, Bay, and Delta regions.

NORTHERN COASTAL SALT MARSH

This highly productive community is dominated by salt-tolerant hydrophytes (water-loving plants). Pacific cord grass grows nearest to the open water, and pickleweed grows farther away on slightly higher elevations. A more diverse mix of species occurs at the transition with the adjacent upland community.

This community is found along the sheltered fringes of bays, lagoons, and estuaries, with regular saltwater tidal inundation. Northern coastal salt marsh is distributed along the coast from the Oregon border south to Point Conception. In the study area, northern coastal salt marsh is found in the Bay, Delta, and Sacramento River regions.

TABLE S-1

COMPARISON OF VEGETATION TYPES USED IN THIS DOCUMENT WITH OTHER CALIFORNIA VEGETATION CLASSIFICATION SYSTEMS

Common Natural Communities and Rare Natural Communities	Wieslander (1945)	California Native Plant Society (1993)	DFG Classification System (Holland 1986)
Mixed conifer forest	Pine-Douglas fir-fir (M), pine (P), Douglas fir (D), lodgepole pine-whitebark pine (L), fir (F)	Lower montane coniferous forest	Lower montane coniferous forest
--	--	North Coast coniferous forest	Coast and Klamath Range conifer forest
--	--	Upper montane coniferous forest	Upper montane coniferous forest
--	--	Subalpine coniferous forest	Subalpine coniferous forest
Montane hardwood	Woodland (hardwoods) (W)	Broad-leaved upland forest	Broad-leaved upland forest
--	--	Cismontane woodland, in part	Cismontane woodland, in part
Pinyon-juniper	Juniper (J), pinyon pine (N)	Pinyon and juniper woodlands	Pinyon and juniper woodlands
--	--	--	Great Basin woodlands
--	--	--	Great Basin pinyon and juniper woodlands
Valley foothill hardwood	Woodland-grass (V)	Cismontane woodland, in part	Cismontane woodland
Valley oak woodland*	--	--	Valley oak woodland*
Valley foothill riparian	--	Riparian forest	Riparian forest
Valley oak riparian forest*	--	--	Great Valley valley oak riparian forest*
Fremont cottonwood riparian forest*	--	--	Great Valley cottonwood riparian forest*
Mixed riparian forest*	--	--	Great Valley mixed riparian forest*
--	--	Riparian woodland	Riparian woodland
Sycamore alluvial woodland*	--	--	Sycamore alluvial woodland*
--	--	Riparian scrub	Riparian scrub
Great Valley willow scrub*	--	--	Great Valley willow scrub*
Great Valley mesquite scrub*	--	--	Great Valley mesquite scrub*
Elderberry savanna*	--	--	Elderberry savanna*
Montane riparian	--	--	Montane riparian forest
Desert riparian	--	--	Mojave riparian forest
Chaparral	Chaparral (c)	Chaparral	Chaparral
Ione chaparral*	--	--	Ione chaparral*
Coastal scrub	Coastal sagebrush (T)	Coastal scrub	Coastal scrub
--	--	--	Coastal bluff scrub, in part

Table S-1. Comparison of Vegetation Types Used in This Document with Other California Vegetation Classification Systems

Common Natural Communities and Rare Natural Communities	Wieslander (1945)	California Native Plant Society (1993)	DFG Classification System (Holland 1986)
Alkali desert scrub	Great Basin sagebrush (S), in part	Chenopod scrub	Chenopod scrub
--	--	--	Desert chenopod scrub
--	--	--	Great Valley chenopod scrub
Valley sink scrub*	--	--	Valley sink scrub*
Valley saltbush scrub*	--	--	Valley saltbush scrub*
Desert scrub	Desert (Z)	Desert scrub	Mojavean desert scrub
--	--	--	Sonoran desert scrub
Sagebrush and bitterbrush scrub	Great Basin sagebrush (S), in part	Great Basin scrub	Great Basin scrub
Inland dunes	--	Inland dunes	Stabilized interior dunes*
--	--	--	Monvero residual dunes*
Coastal beaches and cliffs	--	--	Coastal bluff scrub, in part
--	--	Coastal bluff scrub	--
--	--	--	Coastal dunes
Grassland	Grass (G)	--	Grasslands, vernal pools, and other herb communities
--	--	Valley and foothill grasslands	Valley and foothill grasslands
Valley needlegrass grassland*	--	--	Valley needlegrass grassland*
Serpentine bunchgrass grassland* Valley sacaton grassland*	--	--	Serpentine bunchgrass*
Wildflower field*	--	--	Wildflower field*
--	--	Great Basin grassland	Great Basin grassland
--	--	Coastal prairie	Coastal prairie
Alkali meadow and seep	--	Meadows	Meadows and seeps
--	--	--	Alkali meadow, alkali seep
Vernal pools*	--	Vernal pools*	Vernal pools*
Freshwater emergent wetland	Marsh, in part	--	Bog and marsh
--	--	Marshes and swamps, in part	Marsh and swamp
Coastal and valley freshwater marsh*	--	--	Coastal and valley freshwater marsh*
Cismontane alkali marsh*	--	--	Cismontane alkali marsh*
Bogs and fens	--	Bog and fen	Bog and fen
Saline emergent wetland	Marsh, in part	Marshes and swamps, in part	Marsh and swamp
--	--	--	Coastal salt marsh*
Coastal brackish marsh*	--	--	Coastal brackish marsh*
Northern coastal salt marsh*	--	--	Northern coastal salt marsh*

Table S-1. Comparison of Vegetation Types Used in This Document with Other California Vegetation Classification Systems (Continued)

Common Natural Communities and Rare Natural Communities	Wieslander (1945)	California Native Plant Society (1993)	DFG Classification System (Holland 1986)
Agricultural	Agricultural (A)	None	None
Pasture	--	--	--
Orchard/vineyard	--	--	--
Row crops	--	--	--
Grain	--	--	--
Rice	--	--	--
Cotton	--	--	--

NOTES:

* = rare natural community.
-- = indicates no equivalent community type

Table S-1. Comparison of Vegetation Types Used in This Document with Other California Vegetation Classification Systems (Continued)

TABLE S-2

COMMON AND SCIENTIFIC NAMES OF PLANT SPECIES

Common Name	Scientific Name	Growth Habitat	Family
African brass-buttons	*Cotula coronopifolia* *	AH	Asteraceae
Ahart's dwarf rush	*Juncus leiospermus* var. *ahartii*	AH	Juncaceae
Alameda or pallid manzanita	*Arctostaphylos pallida*	S	Ericaceae
Alder	*Alnus* spp.	T	Betulaceae
Alkali goldenbush	*Isocoma acradenia* [*Haplopappus a.*]	S	Asteraceae
Alkali heath	*Frankenia salina* [*F. grandiflora*]	PH	Frankeniaceae
Alkali heliotrope	*Heliotropium curassavicum* [ssp. *oculatum*]	PH	Hydrophyllaceae
Alkali rubber rabbitbrush	*Chrysothamnus nauseosus* ssp. *hololeucus*	S	Asteraceae
Alkali sacaton	*Sporobolus airoides*	PG	Poaceae
Alkali weed	*Cressa truxillensis* [var. *vallicola*]	PH	Convolvulaceae
Allscale	*Atriplex polycarpa*	S	Chenopodiaceae
Antelope bush	*Purshia glandulosa* [*P. tridentata* var. *g.*]	S	Rosaceae
Antioch Dunes evening primrose	*Oenothera deltoides* ssp. *howellii*	PH	Onagraceae
Apricot globemallow	*Spharalcea ambigua*	PH	Malvaceae
Arizona cypress	*Cupressus arizonica* ssp. *arizonica*	T	Cupressaceae
Arrow weed	*Pluchea sericea*	S	Asteraceae
Arrowhead	*Sagittaria latifolia*	PH	Alismataceae
Arrow-grasses	*Triglochin* spp.	PH	Juncaginaceae
Arroyo willow	*Salix lasiolepis*	T	Salicaceae
Auriculed barestem buckwheat	*Eriogonum nudum* var. *auriculatum*	PH	Polygonaceae
Azaleas	*Rhododendron* spp.	S	Ericaceae
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	S	Cactaceae
Baltic rush	*Juncus balticus* var. *balticus* [*J. arcticus* var. *b.*]	PH	Juncaceae
Basket evening primrose	*Oenothera deltoides* ssp. *deltoides*	A/PH	Onagraceae
Beach morning-glory	*Calystegia soldanella* [*Convolvulus s.*]	PV	Convolvulaceae
Beach rye-grass	*Leymus mollis [Elymus mollis]*	PG	Poaceae
Beach saltbush	*Atriplex leucophylla*	PH	Chenopodiaceae
Beavertail cactus	*Opuntia basilaris* ssp. *basilaris*	S	Cactaceae
Bicolored gilia	*Gilia bicolor*	AH	Polemoniaceae
Bicolored lupine	*Lupinus bicolor* [*L. hirsutulus*, *L. micranthus* var. *b.*, *L. b.* vars.]	AH	Fabaceae
Big galleta	*Pleuraphis rigida*	PG	Poaceae

Common Name	Scientific Name	Growth Habitat	Family
Big sagebrush	*Artemisia tridentata* ssp. *tridentata*	S	Asteraceae

Common Name	Scientific Name	Growth Habitat	Family
Big saltbush	*Atriplex lentiformis* var. *lentiformis*	S	Chenopodiaceae
Bigleaf maple	*Acer macrophyllum*	T	Aceraceae
Bigleaf sedge	*Carex amplifolia*	PH	Cyperaceae
Bird's beaks	*Cordylanthus* spp.	AH	Scrophulariaceae
Bitter cherry	*Prunus emarginata* [*P. e.* var. *crenulata*]	S	Rosaceae
Black cottonwood	*Populus balsamifera* ssp. *trichocarpa* [*P. t.*]	T	Salicaceae
Black oak	*Quercus kelloggii*	T	Fagaceae
Black sage	*Salvia mellifera*	S	Lamiaceae
Black willow	*Salix gooddingii* [*S. g.* var. *variabilis*]	T	Salicaceae
Blackberries	*Rubus* spp.	PV	Rosaceae
Bladderpod	*Isomeris arborea [Cleome isomeris]*	S	Capparaceae
Bladderwort	*Utricularia* spp.	A/PH	Lentibulariaceae
Blue elderberry	*Sambucus mexicana* [*S. caerulea* var. *m.*]	S	Caprifoliaceae
Blue oak	*Quercus douglasii*	T	Fagaceae
Blue rye-grass	*Elymus glaucus* ssp. *glaucus*	PG	Poaceae
Bluebunch wheatgrass	*Pseudoroegneria spicata* ssp. *spicata* [*Andropogon spicatum*]	PG	Poaceae
Blue-blossom ceanothus	*Ceanothus thyrsiflorus* var. *thyrsiflorus*	S	Rhamnaceae
Bottlebrush squirreltail	*Elymus elymoides* ssp. *elymoides* [*Sitanion hystrix* vars., *S. e.*]	PG	Poaceae
Box elder	*Acer negundo* ssp. *californicum*	T	Aceraceae
Brittlebush	*Encelia farinosa*	S	Asteraceae
Broadleaved cattail	*Typha latifolia*	PH	Typhaceae
Brome grasses	*Bromus* spp.	AG	Poaceae
Buck brush	*Ceanothus cuneatus* [vars. *dubius* and *submontanus*]	S	Rhamnaceae
Bud sagebrush	*Artemisia spinescens*	S	Asteraceae
Bulrushes	*Scirpus* spp.	PH	Cyperaceae
Burro bush	*Ambrosia dumosa*	S	Asteraceae
Bur-marigold	*Bidens laevis*	A/PH	Asteraceae
Bur-reed	*Sparganium eurycarpum* ssp. *eurycarpum*	PH	Typhaceae
Bush chinquapin	*Chysolepis sempervirens [Castanopsis sempervirens]*	S	Fagaceae
Bush lupine	*Lupinus arboreus* var. *arboreus*	S	Fabaceae
Bush monkeyflower	*Mimulus aurantiacus* [*Diplacus a., D. longiflorus, M. l.*]	S	Scrophulariaceae
Bush seepweed	*Suaeda moquinii* [*S. torreyana*]	S	Chenopodiaceae

Common Name	Scientific Name	Growth Habitat	Family
Butte County meadowfoam	*Limnanthes floccosa* ssp. *californica*	AH	Limnanthaceae
Buttonbush	*Cephalanthus occidentalis* var. *californicus*	S	Rubiaceae
California barrel cactus	*Ferocactus cylindraceus* var. *cylindraceus* [*F. acanthodes, Echinocactus c.*]	S	Cactaceae
California bay	*Umbellularia californica* var. *californica*	T	Lauraceae
California blackberry	*Rubus ursinus* ssp. *ursinus* var. *ursinus* [*R. vitifolius* sspp. *u.* and *v.*]	PV	Rosaceae
California buckeye	*Aesculus californica*	T	Hippocastanaceae
California buckwheat	*Eriogonum fasciculatum*	S	Polygonaceae
California coffeeberry	*Rhamnus californica* var. *californica*	S	Rhamnaceae
California cord grass	*Spartina foliosa*	PG	Poaceae
California croton	*Croton californicus* var. *californicus*	PH	Euphorbiaceae
California flannel bush	*Fremontodendron californicum* ssp. *californicum*	S	Sterculiaceae
California jewelflower	*Caulanthus californicus*	AH	Brassicaceae
California juniper	*Juniperus californica*	S	Cupressaceae
California Labrador tea	*Ledum glandulosum* var. *californicum* [*L. g.* ssp. *g.* var. *c.*]	S	Ericaceae
California lotus	*Lotus subpinnatus*	AH	Fabaceae
California matchweed	*Gutierrezia californica*	S	Asteraceae
California melic grass	*Melica californica* var. *californica*	PG	Poaceae
California oatgrass	*Danthonia californica*	PG	Poaceae
California pipestem clematis	*Clematis ligusticifolia*	PV	Ranunculaceae
California pitcher plant	*Darlingtonia californica*	PH	Sarraceniaceae
California poppy	*Eschscholzia californica* var. *californica*	AH	Papaveraceae
California sagebrush	*Artemisia californica*	S	Asteraceae
California sea-blite	*Suaeda californica*	S	Chenopodiaceae
California wild grape	*Vitis californica*	PV	Vitaceae
California wild rose	*Rosa californica*	S	Rosaceae
California yerba santa	*Eriodictyon californicum*	S	Hydrophyllaceae
Canyon live oak	*Quercus chrysolepis* var. *chrysolepis*	T	Fagaceae
Cattails	*Typha* spp.	PH	Typhaceae
Ceanothus	*Ceanothus* spp.	S	Rhamnaceae
Chamise	*Adenostoma fasciculatum*	S	Rosaceae
Cheesebush	*Hymenoclea salsola*	S	Asteraceae

Common Name	Scientific Name	Growth Habitat	Family
Chinese Camp brodiaea	*Brodiaea pallida*	PH	Amaryllidaceae
Clara Hunt's milkvetch	*Astragalus clarianus*	AH	Fabaceae
Clovers	*Trifolium* spp.	PH	Fabaceae
Coast buckwheat	*Eriogonum latifolium*	PH	Polygonaceae
Coast live oak	*Quercus agrifolia* var. *agrifolia* [*Q. pricei*]	T	Fagaceae
Coastal sand-verbena	*Abronia latifolia*	PH	Nyctaginaceae
Cocklebur	*Xanthium strumarium* var. *canadense*	AH	Asteraceae
Colusa grass	*Neostapfia colusana*	AG	Poaceae
Common threesquare	*Scirpus pungens* [*S. americanus*]	PH	Cyperaceae
Contra Costa goldfields	*Lasthenia conjugens*	AH	Asteraceae
Contra Costa wallflower	*Erysimum capitatum* ssp. I	AH	Brassicaceae
Cord grasses	*Spartina* spp.	PG	Poaceae
Cottonwood	*Populus* spp.	T	Salicaceae
Coyote brush	*Baccharis pilularis* [spp. *consanguinea* and *pilularis*]	S	Asteraceae
Coyote thistles	*Eryngium* spp.	PH	Apiaceae
Crampton's tuctoria or Solano grass	*Tuctoria mucronata*	AG	Poaceae
Creek dogwood	*Cornus sericea* [*C. californica, C. stolonifera]*	S	Cornaceae
Creosote bush	*Larrea tridentata* [*L. divericata*]	S	Zygophyllaceae
Crystalline iceplant	*Mesembryanthemum crystallinum* *	AH	Aizoaceae
Curlleaf mountain mahogany	*Cercocarpus ledifolius* var. *ledifolius*	S	Rosaceae
Currants	*Ribes* spp.	S	Grossulariaceae
Cypresses	*Cupressus* spp.	T	Cupressaceae
Deer brush	*Ceanothus integerrimus* [vars. *californicus, macrothyrsus,* and *puberulus*]	S	Rhamnaceae
Deerweed	*Lotus scoparius*	PH	Fabaceae
Desert agave	*Agave deserti*	S	Agavaceae
Desert needlegrass	*Achnatherum speciosum* [*Stipa speciosa*]	PG	Poaceae
Desert tea	*Ephedra californica*	S	Ephedraceae
Ditchgrasses	*Ruppia* spp.	PH	Potamogetonaceae
Dogwoods	*Cornus* spp.	S	Cornaceae
Douglas' false-willow	*Baccharis douglasii*	PH	Asteraceae
Douglas-fir	*Pseudotsuga menziesii* var. *menziesii* [*P. taxifolia*]	T	Pinaceae

Common Name	Scientific Name	Growth Habitat	Family
Dove weed	*Eremocarpus setigerus*	AH	Euphorbiaceae
Downingias	*Downingia* spp.	AH	Campanulaceae
Duckweeds	*Lemna* spp.	AH	Lemnaceae
Engelmann's hedgehog cactus	*Echinocactus engelmannii*	S	Cactaceae
European beachgrass	*Ammophila arenaria* *	PG	Poaceae
European sea rocket	*Cakile maritima* *	AH	Brassicaceae
Evening primroses	*Camissonia* spp.	PH	Onagraceae
Fiddlenecks	*Amsinckia* spp.	AH	Boraginaceae
Fig-marigolds	*Carpobrotus* spp.	PH/S	Aizoaceae
Filarees	*Erodium* spp.	AH	Geraniaceae
Flaming trumpet	*Collomia rawsoniana*	AH	Polemoniaceae
Fleshy jaumea	*Jaumea carnosa*	PH	Asteraceae
Foothill needlegrass	*Nassella lepida* [*Stipa lepida* var. *lepida*]	PG	Poaceae
Foothill pine	*Pinus sabiniana*	T	Pinaceae
Fourwing saltbush	*Atriplex canescens* ssp. *canescens* var. *canescens*	S	Chenopodiaceae
Fremont cottonwood	*Populus fremontii* [*P. f.* ssp. *f.* vars. *arizonica* and *macdougalii*]	T	Salicaceae
Fremont dalea	*Psorothamnus fremontii* var. *fremontii* [*Dalea* f.]	S	Fabaceae
Galleta	*Pleuraphis jamesii*	PG	Poaceae
Giant coreopsis	*Coreopsis gigantea*	S	Asteraceae
Giant sequoia	*Sequoiadendron giganteum*	T	Taxodiaceae
Goldenbushes	*Isocoma* spp.	S	Asteraceae
Goldfields	*Lasthenia* spp.	AH	Asteraceae
Gooseberries	*Ribes* spp.	S	Grossulariaceae
Greasewood	*Sacrobatus vermiculatus* [*S. v.* var. *baileyi*]	S	Chenopodiaceae
Greene's tuctoria	*Tuctoria greenei*	AG	Poaceae
Greenleaf manzanita	*Arctostaphylos patula*	S	Ericaceae
Hairy Orcutt grass	*Orcuttia pilosa*	AG	Poaceae
Hartweg's golden sunburst	*Pseudobahia bahiifolia*	AH	Asteraceae
Hoary nettle	*Urtica dioica* ssp. *gracilis* var. *holosericea* [*U. h.*]	PH	Urticaceae
Honeysweet tidestromia	*Tidestromia oblongifolia* ssp. *oblongifolia*	S	Amaranthaceae
Hoover's eriastrum	*Eriastrum hooveri*	AH	Polemoniaceae
Hoover's spurge	*Chamaesyce hooveri*	AH	Euphorbiaceae

Common Name	Scientific Name	Growth Habitat	Family
Horsetails	*Equisetum* spp.	PH	Equisetaceae
Horseweeds	*Conyza* spp.	AH	Asteraceae
Huckleberry oak	*Quercus vaccinifolia*	S	Fagaceae
Idaho fescue	*Festuca idahoensis*	PG	Poaceae
Incense cedar	*Calocedrus decurrens*	T	Cupressaceae
Indian ricegrass	*Achnatherum hymenoides* [*Oryzopsis h.*]	PG	Poaceae
Interior live oak	*Quercus wislizenii* var. *wislizenii*	T	Fagaceae
Iodine bush	*Allenrolfea occidentalis*	S	Chenopodiaceae
Ione buckwheat	*Eriogonum apricum* var. *apricum*	S	Polygonaceae
Ione manzanita	*Arctostaphylos myrtifolia*	S	Ericaceae
Irish Hill buckwheat	*Eriogonum apricum* var. *prostratum*	S	Polygonaceae
Italian ryegrass	*Lolium multiflorum* * [*L. m. varieties, L. perenne* ssp. *m.*]	AG	Poaceae
Jeffrey pine	*Pinus jeffreyi*	T	Pinaceae
Junipers	*Juniperus* spp.	S/T	Cupressaceae
Keck's checkerbloom	*Sidalcea keckii*	AH	Malvaceae
Kelso Creek monkeyflower	*Mimulus shevockii*	AH	Scrophulariaceae
Kern mallow	*Eremalche parryi* ssp. *kernensis* [*E. k.*]	AH	Malvaceae
Kidney-leaved buckwheat	*Eriogonum reniforme*	AH	Polygonaceae
Kochias	*Kochia* spp.	S	Chenopodiaceae
Large-flowered fiddleneck	*Amsinckia grandiflora*	AH	Boraginaceae
Large-head clover	*Trifolium macrocephalum*	PH	Fabaceae
Laurelleaf sumac	*Malosma laurina* [*Rhus l.*]	S	Anacardiaceae
Live-forevers	*Dudleya* spp.	PH	Crassulaceae
Lizard tail	*Eriophyllum staechadifolium* [var. *artemisiaefolium*]	PH	Asteraceae
Long-beaked filaree	*Erodium botrys* *	AH	Geraniaceae
Low barley	*Hordeum depressum*	AG	Poaceae
Low sagebrush	*Artemisia arbuscula*	S	Asteraceae
Manycolored lupine	*Lupinus variicolor* [*L. franciscanus, L. michneri, L. versicolor*]	AH	Fabaceae
Manzanitas	*Arctostaphylos* spp.	S	Ericaceae
Mariposa lilies	*Calochortus* spp.	PH	Liliaceae
Mariposa manzanita	*Arctostaphylos viscida* ssp. *mariposa*	S	Ericaceae
Meadowfoams	*Limnanthes* spp.	AH	Limnanthaceae

Common Name	Scientific Name	Growth Habitat	Family
Medusa head	*Taeniatherum caput-medusae* * [*Elymus caput-medusae, T. asperum*]	PG	Poaceae
Melic grasses	*Melica* spp.	PG	Poaceae
Merced clarkia	*Clarkia lingulata*	AH	Onagraceae
Merced monardella	*Monardella leucocephala*	AH	Lamiaceae
Mesquite	*Prosopis glandulosa* var. *torreyana*	S	Fabaceae
Miner's lettuce	*Claytonia perfoliata* ssp. *perfoliata* var. *perfoliata* [*Montia p.*]	AH	Portulacaceae
Mistletoe	*Phoradendron* spp.	PH	Viscaceae
Mojave yucca	*Yucca schidigera*	S	Agavaceae
Mountain alder	*Alnus incana* ssp. *tenuifolia*	S	Betulaceae
Mountain mahogany	*Cercocarpus betuloides* [*C. montanus* var. *glaber*]	S	Rosaceae
Mountain misery	*Chamaebatia foliolosa*	PH	Rosaceae
Mountain sagebrush	*Artemisia tridentata* ssp. *vaseyana*	S	Asteraceae
Mugwort	*Artemisia douglasiana*	PH	Asteraceae
Mule fat	*Baccharis salicifolia* [*B. viminea, B. glutinosa*]	S	Asteraceae
Mustards	*Brassica/Hirshfeldia/Sisymbrium* spp.	A/PH	Brassicaceae
Narrowleaf goldenbush	*Ericameria linearifolia* [*Haplopappus l.* and ssp. *interior, Stenotopsisi, S. l.*]	S	Asteraceae
Narrow-leaved cattail	*Typha domingensis*	PH	Typhaceae
Navarretia	*Navarretia* spp.	AH	Polemoniaceae
Needlegrasses	*Nassella/Achnatherum* spp.	PG	Poaceae
Needle-and-thread	*Hesperostipa comata* [*Stipa c.*]	PG	Poaceae
Nevada tea	*Ephedra nevadensis*	S	Ephedraceae
Nodding needlegrass	*Nassella cernua* [*Stipa c., S. lepida* var. *andersonii*]	PG	Poaceae
Northern California black walnut	*Juglans californica* ssp. *hindsii*	T	Juglandaceae
Oak gooseberry	*Ribes quercetorum*	S	Grossulariaceae
Oaks	*Quercus* spp.	T	Fagaceae
Ocotillo	*Fouquieria splendens* ssp. *splendens*	S	Fouquieriaceae
One-sided bluegrass	*Poa secunda* ssp. *secunda* [*P. scabrella*]	PG	Poaceae
Oregon ash	*Fraxinus latifolia* [*F. oregona*]	S	Oleaceae
Owl's-clovers	*Castilleja* spp. [*Orthocarpus* spp.]	AH	Scrophulariaceae
Pacific madrone	*Arbutus menziesii*	T	Ericaceae
Palmate-bracted bird's-beak	*Cordylanthus palmatus*	AH	Scrophulariaceae

Common Name	Scientific Name	Growth Habitat	Family
Parry saltbush	*Atriplex parryi*	S	Chenopodiaceae
Pickleweed	*Arthrocnemum subterminale* [*Salicornia s.*]	S	Chenopodiaceae
Pickleweeds	*Salicornia/Arthrocnemum* spp.	S	Chenopodiaceae
Pine Hill ceanothus	*Ceanothus roderickii*	S	Rhamnaceae
Pine Hill flannel bush	*Fremontodendron decumbens*	S	Sterculiaceae
Pinemat manzanita	*Arctostaphylos nevadensis* [*A. parvifolia*]	S	Ericaceae
Piute cypress	*Cupressus arizonica* ssp. *nevadensis*	T	Cupressaceae
Piute Mtns. navarretia	*Navarretia setiloba*	AH	Polemoniaceae
Pleasant Valley Mariposa lily	*Calochortus clavatus* var. *avius*	PH	Liliaceae
Pogogyne	*Pogogyne* spp.	AH	Lamiaceae
Poison oak	*Toxicodendron diversilobum* [*Rhus diversiloba*]	S/V	Anacardiaceae
Ponderosa pine	*Pinus ponderosa*	T	Pinaceae
Pondweeds	*Potamogeton* spp.	PH	Potamogentonaceae
Popcornflowers	*Plagiobothrys* spp.	AH	Boraginaceae
Purple needlegrass	*Nassella pulchra* [*Stipa pulchra*]	PG	Poaceae
Purple sage	*Salvia leucophylla*	S	Lamiaceae
Quaking aspen	*Populus tremuloides* [*P. t. varieties, P. tremula*]	T	Salicaceae
Rabbitbrush	*Chrysothamnus* spp.	S	Asteraceae
Rawhide Hill onion	*Allium tuolumnense*	PH	Alliaceae
Red brome	*Bromus madritensis* ssp. *rubens* * [*B. r.*]	AG	Poaceae
Red fir	*Abies magnifica*	T	Pinaceae
Red willow	*Salix laevigata* [*S. l.* var. *araquipa*]	T	Salicaceae
Redshank	*Adenostoma sparsifolium*	S	Rosaceae
Redstem filaree	*Erodium cicutarium* *	AH	Geraniaceae
Rice cutgrass	*Leersia oryzoides*	PG	Poaceae
Ripgut grass	*Bromus diandrus* *	AG	Poaceae
River bulrush	*Scirpus fluviatilis*	PH	Cyperaceae
Rose-mallow [California hibiscus]	*Hibiscus lasiocarpus* [*H. californicus*]	S	Malvaceae
Roundleaf sundew	*Drosera rotundifolia* var. *rotundifolia*	PH	Droseraceae
Rubber rabbitbrush	*Chrysothamnus nauseosus* spp.	S	Asteraceae
Rushes	*Juncus* spp.	PH	Juncaceae

Common Name	Scientific Name	Growth Habitat	Family
Rye-grasses	*Elymus/Leymus* spp.	PG	Poaceae
Sacramento Orcutt grass	*Orcuttia viscida*	AG	Poaceae
Sagebrushes	*Artemisia* spp.	S	Asteraceae
Sages	*Salvia* spp.	S	Lamiaceae
Salt marsh bird's beak	*Cordylanthus maritimus* ssp. *maritimus*	AH	Scrophulariaceae
Salt marsh bird's beak	*Cordylanthus maritimus* ssp. *palustris*	AH	Scrophulariaceae
Saltbushes	*Atriplex* spp.	S	Chenopodiaceae
Saltgrass	*Distichlis spicata* var. *stricta*	PG	Poaceae
Saltmarsh dodder	*Cuscuta salina* var. *salina*	AV	Cuscutaceae
Saltwort	*Batis maritima*	S	Bataceae
San Joaquin adobe sunburst	*Pseudobahia peirsonii*	AH	Asteraceae
San Joaquin saltplant	*Atriplex joaquiniana* [*A. patula* ssp. *spicata*]	AH	Chenopodiaceae
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	AG	Poaceae
San Joaquin woollythreads	*Lembertia congdonii*	AH	Asteraceae
Sandbar willow	*Salix sessilifolia* [*S. hindsiana*]	S	Salicaceae
Sandmat manzanita	*Arctostaphylos pumila*	S	Ericaceae
Sanford's arrowhead	*Sagittaria sanfordii*	PH	Alismataceae
Scadden Flat checkerbloom	*Sidalcea stipularis*	PH	Malvaceae
Screw bean	*Prosopis pubescens*	S	Fabaceae
Scrub oak	*Quercus berberidifolia* [*Q. dumosa* in part]	S	Fagaceae
Sea lavenders	*Limonium* spp.	PH	Plumbaginaceae
Seaside arrow-grass	*Triglochin maritima* [*T. elata*]	PH	Juncaginaceae
Seaside daisy	*Erigeron glaucus*	PH	Asteraceae
Seaside plantain	*Plantago maritima*	PH	Plantaginaceae
Sea-pink, thrift	*Armeria maritima* ssp. *californica*	PH	Plumbaginaceae
Sedges	*Carex* spp.	PH	Cyperaceae
Shadscale	*Atriplex confertifolia*	S	Chenopodiaceae
Shirley Meadows star-tulip	*Calochortus westonii*	PH	Liliaceae
Silver wormwood	*Artemisia ludoviciana*	PH	Asteraceae
Silverweed	*Potentilla anserina* ssp. *pacifica* [*P. egedei* ssp. *grandis*]	PH	Rosaceae
Singleleaf pinyon pine	*Pinus monophylla*	T	Pinaceae
Slender cattail	*Typha angustifolia*	PH	Typhaceae

Common Name	Scientific Name	Growth Habitat	Family
Slender fescue	*Vulpia bromoides* * [*Festuca dertonensis*]	AG	Poaceae
Slender Orcutt grass	*Orcuttia tenuis*	AG	Poaceae
Slough sedge	*Carex obnupta*	PH	Cyperaceae
Snow bush	*Ceanothus cordulatus*	S	Rhamnaceae
Snowbrush ceanothus	*Ceanothus velutinus* var. *velutinus*	S	Rhamnaceae
Soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*	AH	Scrophulariaceae
Soft chess	*Bromus hordeaceus* * [*B. mollis, B. racemosus*]	AG	Poaceae
Sphagnum moss	*Sphagnum* spp.	PF	Sphagnaceae
Spicebush	*Calycanthus occidentalis*	S	Calycanthaceae
Spinescale	*Atriplex spinifera*	S	Chenopodiaceae
Spiny redberry	*Rhamnus crocea* ssp. *crocea*	S	Rhamnaceae
Springville clarkia	*Clarkia springvillensis*	AH	Onagraceae
Squaw carpet	*Ceanothus prostratus* var. *prostratus* [vars. *laxus* and *occidentalis*]	S	Rhamnaceae
Sticky whiteleaf manzanita	*Arctostaphylos viscida* ssp. *viscida*	S	Ericaceae
Sugar bush	*Rhus ovata*	S	Anacardiaceae
Sugar pine	*Pinus lambertiana*	T	Pinaceae
Suisun thistle	*Cirsium hydrophilum* var. *hydrophilum*	BH	Asteraceae
Tamarisk	*Tamarix* ssp. *	T/S	Tamaricaceae
Tan oak	*Lithocarpus densiflorus* var. *densiflorus*	T	Fagaceae
Telegraph weed	*Heterotheca grandiflora*	PH	Asteraceae
Thistles	*Cirsium* spp.	A/BH	Asteraceae
Tiburon paintbrush	*Castilleja affinis* ssp. *neglecta*	PH	Scrophulariaceae
Tidy tips	*Layia platyglossa*	AH	Asteraceae
Torrey blazing star	*Mentzelia torreyi*	PH	Loasaceae
Toyon	*Heteromeles arbutifolia* [var. *macrocarpa*]	S	Rosaceae
Tree-anemone	*Carpenteria californica*	S	Phyladelphaceae
Umbrella-sedge	*Cyperus eragrostis*	PH	Cyperaceae
Utah juniper	*Juniperus osteosperma*	S/T	Cupressaceae
Valley oak	*Quercus lobata*	T	Fagaceae
Viscid tule	*Scirpus acutus* var. *occidentalis* [*S. lacustris, S. o.*]	PH	Cyperaceae
Walnuts	*Juglans* spp.	T	Juglandaceae
Water ferns	*Azolla* spp.	AF	Azollaceae

Common Name	Scientific Name	Growth Habitat	Family
Waterlily	*Nymphaea* spp.	PH	Nymphaeaceae
Waterweeds	*Elodea* spp.	PH	Hydrocharitaceae
Water-milfoil	*Myriophyllum* spp.	PH	Haloragidaceae
Western choke cherry	*Prunus virginiana* var. *demissa* [*P. d.*]	S	Rosaceae
Western juniper	*Juniperus occidentalis*	S/T	Cupressaceae
Western redbud	*Cercis occidentalis*	S/T	Fabaceae
Western sycamore	*Platanus racemosa* [*P. r.* var. *wrightii*]	T	Platanaceae
Whipple's monkeyflower	*Mimulus whipplei*	AH	Scrophulariaceae
White alder	*Alnus rhombifolia*	T	Betulaceae
White fir	*Abies concolor*	T	Pinaceae
Whitebark pine	*Pinus albicaulis*	T	Pinaceae
White-thorn ceanothus	*Ceanothus leucodermis*	S	Rhamnaceae
Wild barley	*Hordeum* spp.	AG	Poaceae
Wild oats	*Avena* spp. *	AG	Poaceae
Willows	*Salix* spp.	S/T	Salicaceae
Woolly marbles	*Psilocarphus* spp.	AH	Asteraceae
Yellow hairgrass	*Aira praecox* *	AG	Poaceae
Yellow willow	*Salix lasiandra* var. *lasiandra* [*S. arguta, S. lasiandra* var. *lancifolia, S. l.*]	T	Salicaceae
Yerba mansa	*Anemopsis californica* [*A. c.* var. *c.*]	PH	Saururaceae
Yerba santas	*Eriodictyon* spp.	S	Hydrophyllaceae

NOTES:

Scientific nomenclature follows Hickman (1993) for natives and Skinner and Pavlik (1994) for special-status species.

* = indicates non-native taxa that have become naturalized or persist without cultivation.

Common names follow Abrams and Ferris (1960), Hickman (1993), Niehaus and Ripper (1976), and DeGarmo (1980).

Growth habitat definitions:

AF = annual fern	BH = biennial herb	PV = perennial vine
AG = annual grass	PF = perennial fern or fernally	S = shrub
AH = annual herb	PG = perennial grass	T = tree
AV = annual vine	PH = perennial herb	

Table S-2. Common and Scientific Names of Plant Species (Continued)

TABLE S-3

COMMON AND SCIENTIFIC NAMES OF WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE STUDY AREA

C-009174

Common Name	Scientific Name
Invertebrates	
California linderiella	*Linderiella occidentalis*
Conservancy fairy shrimp	*Branchinecta conservatio*
Longhorn fairy shrimp	*Branchinecta longiantenna*
Vernal pool fairy shrimp	*Branchinecta lynchi*
Vernal pool tadpole shrimp	*Lepiduris packardi*
Insects	
Delta green ground beetle	*Elaphrus viridis*
Kern primrose sphinx moth	*Euproserpinus euterpe*
Lange's metalmark	*Apodemia mormo langei*
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*
Snails	
Shasta crayfish	*Pacifastacus fortis*
Shasta sideband snail	*Monadenia troglodytes*
Birds	
Acorn woodpecker	*Melanerpes formicivorus*
Aleutian Canada goose	*Branta canadensis leucopareia*
American avocet	*Recurvirostra americana*
American bittern	*Botaurus lentiginosus*
American black oystercatcher	*Haematopus bachmani*
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius*
American peregrine falcon	*Falco peregrinus anatum*
American pipit	*Anthus rubescens*
American robin	*Turdus migratorius*
American white pelican	*Pelecanus erythrorhynchos*
American wigeon	*Anas americana*
Ash-throated flycatcher	*Myiarchus cinerascens*
Bald eagle	*Haliaeetus leucocephalus*
Band-tailed pigeon	*Columba fasciata*
Bank swallow	*Riparia riparia*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Bewick's wren	*Thryomanes bewickii*
Black-bellied plover	*Pluvialis squatarola*
Black-billed magpie	*Pica pica*
Black-crowned night-heron	*Nycticorax nycticorax*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-necked stilt	*Himantopus mexicanus*

Common Name	Scientific Name
Black phoebe	*Sayornis nigricans*
Black rail	*Laterallus jamaicensis*
Black-shouldered kite	*Elanus caeruleus*
Black-throated sparrow	*Amphispiza bilineata*
Blue-gray gnatcatcher	*Polioptila caerulea*
Blue grouse	*Dendragapus obscurus*
Brandt's cormorant	*Phalacrocorax penicillatus*
Brewer's blackbird	*Euphagus cyanocephalus*
Bufflehead	*Bucephala albeola*
Burrowing owl	*Athene cunicularia*
Bushtit	*Psaltriparus minimus*
California black rail	*Laterallus jamaicensis coturniculus*
California brown pelican	*Pelecanus occidentalis californicus*
California clapper rail	*Rallus longirostris obsoletus*
California condor	*Gymnogyps californianus*
California gull	*Larus californicus*
California least tern	*Sterna antillarum browni*
California quail	*Callipepla california*
California spotted owl	*Strix occidentalis occidentalis*
California thrasher	*Toxostoma redivivum*
California towhee	*Pipilo crissalis*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Cassin's finch	*Carpodacus cassinii*
Chestnut-backed chickadee	*Parus rufescens*
Chipping sparrow	*Spizella passerina*
Cinnamon teal	*Anas cyanoptera*
Clapper rail	*Rallus longirostris*
Clark's grebe	*Aechmophorus clarkii*
Common goldeneye	*Bucephala clangula*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Common murre	*Uria aalge*
Common raven	*Corvus corax*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Picoides pubescens*
Dunlin	*Calidris alpina*
Eared grebe	*Podiceps nigricollis*
Ferruginous hawk	*Buteo regalis*

Common Name	Scientific Name
Gadwall	*Anas strepera*
Gambel's quail	*Callipepla gambelii*
Godwit spp.	*Limosa* spp.
Golden-crowned kinglet	*Regulus satrapa*
Golden eagle	*Aquila chrysaetos*
Gray flycatcher	*Empidonax wrightii*
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Great horned owl	*Bubo virginianus*
Greater roadrunner	*Geococcyx californianus*
Greater sandhill crane	*Grus canadensis tabida*
Greater white-fronted goose	*Anser albifrons*
Greater yellowlegs	*Tringa melanoleuca*
Green-winged teal	*Anas crecca*
Gull ssp.	*Larus* spp.
Hairy woodpecker	*Picoides villosus*
Herring gull	*Larus argentatus*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
House wren	*Troglodytes aedon*
Hutton's vireo	*Vireo huttoni*
Killdeer	*Charadrius vociferus*
Least sandpiper	*Calidris minutilla*
Lesser goldfinch	*Carduelis psaltria*
Lesser sandhill crane	*Grus canadensis canadensis*
Lesser scaup	*Aythya affinis*
Lesser snow goose	*Chen caerulescens hyperborea*
Lewis' woodpecker	*Melanerpes lewis*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Mallard	*Anas platyrhynchos*
Marbled godwit	*Limosa fedoa*
Marsh wren	*Cistothorus palustris*
Mourning dove	*Zenaida macroura*
Northern goshawk	*Accipiter gentilis*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*

Common Name	Scientific Name
Northern spotted owl	*Strix occidentalis caurina*
Nuttall's woodpecker	*Picoides nuttallii*
Orange-crowned warbler	*Vermivora celata*
Osprey	*Pandion haliaetus*
Pelagic cormorant	*Phalacrocorax pelagicus*
Pied-billed grebe	*Podilymbus podiceps*
Pigeon guillemot	*Cepphus columba*
Pileated woodpecker	*Drycopus pileatus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Plain titmouse	*Parus inornatus*
Prairie falcon	*Falco mexicanus*
Red crossbill	*Loxia curvirostra*
Redhead	*Aythya americana*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Ring-necked pheasant	*Phasianus colchicus*
Ross' goose	*Chen rossii*
Ruddy duck	*Oxyura jamaicensis*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Sage grouse	*Centrocercus urophasianus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Saltmarsh yellowthroat	*Geothlypis trichas sinuosa*
Sanderling	*Calidris alba*
Sandhill crane	*Grus canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Scaup ssp.	*Aythya* ssp.
Scoter ssp.	*Melanitta*
Scrub jay	*Aphelocoma coerulescens*
Semipalmated plover	*Charadrius semipalmatus*
Short-eared owl	*Asio flammeus*
Snow goose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Solitary vireo	*Vireo solitarius*
Song sparrow	*Melospiza melodia*
Steller's jay	*Cyanocitta stelleri*
Suisun song sparrow	*Melospiza melodia maxillaris*

Common Name	Scientific Name
Swainson's hawk	*Buteo swainsoni*
Tree swallow	*Tachycineta bicolor*
Tricolored blackbird	*Agelaius tricolor*
Tundra swan	*Cygnus columbianus*
Virginia rail	*Rallus limicola*
Western bluebird	*Sialia mexicana*
Western grebe	*Aechmophorus occidentalis*
Western gull	*Larus occidentalis*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western sandpiper	*Calidris mauri*
Western screech-owl	*Otus kennicottii*
Western snowy plover	*Charadrius alexandrinus nivosus*
Western tanager	*Piranga ludoviciana*
Western wood-pewee	*Contopus sordidulus*
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*
White-breasted nuthatch	*Sitta carolinensis*
White-crowned sparrow	*Zonotrichia leucophrys*
White-faced ibis	*Plegadis chihi*
White-headed woodpecker	*Picoides albolarvatus*
Wild turkey	*Meleagris gallopavo*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Willow flycatcher	*Empidonax traillii*
Winter wren	*Troglodytes troglodytes*
Wood duck	*Aix sponsa*
Wrentit	*Chamaea fasciata*
Yellow-billed magpie	*Pica nuttalli*
Yellow-rumped warbler	*Dendroica coronata*
Salamanders	
Black salamander	*Aneides flavipunctatus*
California tiger salamander	*Ambystoma tigrinum californiense*
Ensatina	*Ensatina eschscholtzi*
Kern Canyon slender salamander	*Batrachoseps simatus*
Mount Lyell salamander	*Hydromantes platycephalus*
Shasta salamander	*Hydromantes shastae*
Frogs and Toads	
Bullfrog	*Rana catesbeiana*
California red-legged frog	*Rana aurora draytoni*
Couch's spadefoot	*Scaphiopus couchi*
Pacific treefrog	*Hyla regilla*
Western spadefoot	*Scaphiopus hammondi*

Common Name	Scientific Name
Western toad	*Bufo boreas*
Lizards and Snakes	
Blunt-nosed leopard lizard	*Gambelia silus*
California horned lizard	*Phrynosoma coronatum frontale*
California mountain kingsnake	*Lampropeltis zonata*
Common kingsnake	*Lampropeltis getulus*
Desert iguana	*Dipsosaurus dorsalis*
Giant garter snake	*Thamnophis couchi gigas*
Gopher snake	*Pituophis melanoleucus*
Rubber boa	*Charina bottae*
Sagebrush lizard	*Sceloporus graciosus*
Sharp-tailed snake	*Contia tenuis*
Side-blotched lizard	*Uta stansburiana*
Sidewinder	*Crotalus cerastes*
Western aquatic garter snake	*Thamnophis couchi*
Western fence lizard	*Sceloporus occidentalis*
Western rattlesnake	*Crotalus viridis*
Western terrestrial garter snake	*Thamnophis elegans*
Western whiptail	*Cnemidophorus tigris*
Mammals	
Allen's chipmunk	*Tamias senex*
American badger	*Taxidea taxus*
Arctic fox	*Alopex lagopus*
Beaver	*Castor canadensis*
Black bear	*Ursus americanus*
Black-tailed hare	*Lepus californicus*
Bobcat	*Lynx rufus*
Botta's pocket gopher	*Thomomys bottae*
Brush rabbit	*Sylvilagus bachmani*
Bushy-tailed woodrat	*Neotoma cinerea*
California ground squirrel	*Spermophilus beecheyi*
California vole	*Microtus californicus*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Desert cottontail	*Sylvilagus audubonii*
Douglas' squirrel	*Tamiasciurus douglasii*
Dusky-footed woodrat	*Neotoma fuscipes*
Fisher	*Martes pennanti*
Fresno kangaroo rat	*Dipodomys nitratoides exilis*
Giant kangaroo rat	*Dipodomys ingens*
Gray fox	*Urocyon cinereoargenteus*

Common Name	Scientific Name
Harbor seal	*Phoca vitulina*
Heermann's kangaroo rat	*Dipodomys heermanni*
Least chipmunk	*Tamias minimus*
Long-tailed vole	*Microtus longicaudus*
Marten	*Martes americana*
Mountain lion	*Felis concolor*
Mule deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*
Northern flying squirrel	*Glaucomys sabrinus*
Nuttall's cottontail	*Sylvilagus nuttallii*
Pronghorn	*Antilocapra americana*
Raccoon	*Procyon lotor*
Red fox	*Vulpes vulpes*
Ringtail	*Bassariscus astutus*
Sagebrush vole	*Lagurus curtatus*
Salt marsh harvest mouse	*Reithrodontomys raviventris*
San Joaquin antelope squirrel	*Ammospermophilus nelsoni*
San Joaquin kit fox	*Vulpes macrotis mutica*
Sierra Nevada red fox	*Vulpes vulpes necator*
Southern grasshopper mouse	*Onychomys torridus*
Stephens' kangaroo rat	*Dipodomys stephensi*
Striped skunk	*Mephitis mephitis*
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*
Tule elk	*Cervus elaphus nannodes*
Virginia opossum	*Didelphis virginiana*
Western gray squirrel	*Sciurus griseus*
Western harvest mouse	*Reithrodontomys megalotis*
Wild pig	*Sus scrofa*
Wolverine	*Gulo gulo*

Table S-3. Common and Scientific Names of Wildlife Species Potentially Occurring in the Study Area (Continued)

TABLE S-4

HABITAT GUILD AND SPECIES SUMMARY

C-009182

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Open Water - Deep Water				
Birds				
Western grebe	F,R	F,R	B,F,R	B,F,R
Clark's grebe	F,R	F,R	B,F,R	B,F,R
White pelican	F,R	F,R	F,R	F,R
Double-crested cormorant	F,R	F,R	F,R	F,R
Canvasback	F,R	F,R	F,R	F,R
Redhead	F,R	F,R	F,R	F,R
Ring-necked duck	F,R	F,R	F,R	F,R
Greater scaup	F,R	F,R		
Lesser scaup	F,R	F,R	F,R	F,R
Black scoter	F,R			
Surf scoter	F,R			
White-winged scoter	F,R			
Common goldeneye	F,R	F,R	F,R	F,R
Barrow's goldeneye	F,R	F,R	F,R	
Bufflehead	F,R	F,R	F,R	F,R
Hooded merganser	F,R	F,R	F,R	F,R
Common merganser		F,R	F,R	F,R
Red-breasted merganser	F,R			
Ruddy duck	F,R	F,R	F,R	F,R
Wilson's phalarope	F,R	F,R	F,R	F,R
Red-necked phalarope	F,R	F,R	F,R	F,R
Bonaparte's gull	F,R	F,R	F,R	F,R
Mew gull	F,R	F,R		
Ring-billed gull	F,R	F,R	F,R	F,R
California gull	F,R	F,R	F,R	F,R
Herring gull	F,R	F,R	F,R	F,R
Thayer's gull	F,R	F,R	F,R	F,R
Western gull	F,R			
Caspian tern	F	F	F	F
Elegant tern	F			
Forster's tern	F,R	F,R	F,R	F,R
Mammals				
River otter	F,R	F,R	F,R	
Open Water - Shallow Water				
Birds				
Black-crowned night-heron	F,R	F,R	F,R	F,R
Great blue heron	F,R	F,R	F,R	F,R
Great egret	F,R	F,R	F,R	F,R
Cattle egret	F,R	F,R		F,R
White-faced ibis	F,R	F,R	F,R	F,R
Tundra swan	F,R	F,R	F,R	F,R
Greater white-fronted goose	F,R	F,R	F,R	F,R
Snow goose	F,R	F,R	F,R	F,R
Ross's goose	F,R	F,R	F,R	F,R
Canada goose	F,R	F,R	F,R	F,R
Green-winged teal	F,R	F,R	F,R	F,R
Mallard	F.R	F.R	F,R	F,R
Northern pintail	F,R	F,R	F,R	F,R
Cinnamon teal	F,R	F,R	F,R	F,R
Northern shoveler	F,R	F,R	F,R	F,R
Gadwall	F,R	F,R	F,R	F,R
American wigeon	F,R	F,R	F,R	F,R
American peregrine falcon	F	F	F	F
Black-necked stilt	F,R	F,R	F,R	F,R
American avocet	F,R	F,R	F,R	F,R
Greater yellowlegs	F,R	F,R	F,R	F,R

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Lesser yellowlegs	F,R	F,R	F,R	F,R
Willet	F,R	F,R	F,R	F,R
Whimbrel	F,R	F,R	F,R	F,R
Long-billed curlew	F,R	F,R	F,R	F,R
Long-billed dowitcher	F,R	F,R	F,R	F,R
Ring-billed gull	F,R	F,R	F,R	F,R
California gull	F,R	F,R	F,R	F,R
Herring gull	F,R	F,R	F,R	F,R
Least tern	F			
Mudflats				
Birds				
American peregrine falcon	F	F	F	F
Black-bellied plover	F,R	F,R	F,R	F,R
Snowy plover	B,F,R	B,F,R		B,F,R
Semipalmated plover	F,R	F,R	F,R	F,R
Killdeer	B,F,R	B,F,R	B,F,R	B,F,R
Black-necked stilt	B,F,R	B,F,R	B,F,R	B,F,R
American avocet	B,F,R	B,F,R	B,F,R	B,F,R
Greater yellowlegs	F,R	F,R	F,R	F,R
Lesser yellowlegs	F,R	F,R	F,R	F,R
Willet	F,R	F,R	F,R	F,R
Spotted sandpiper	F,R	F,R	F,R	F,R
Whimbrel	F,R	F,R	F,R	F,R
Long-billed curlew	F,R	F,R	F,R	F,R
Marbled godwit	F,R	F,R		
Ruddy turnstone	F,R	F,R		
Red knot	F,R			
Sanderling	F,R			
Western sandpiper	F,R	F,R	F,R	F,R
Least sandpiper	F,R	F,R	F,R	F,R
Dunlin	F,R	F,R	F,R	F,R
Short-billed dowitcher	F,R	F,R		
Long-billed dowitcher	F,R	F,R	F,R	F,R
Ring-billed gull	R	R	R	R
California gull	R	R	R	R
Herring gull	R	R	R	R
Caspian tern	R	R	R	R
Forster's tern	R	R	R	R
Least tern	R			
Black tern	R	R	R	R
Freshwater Emergent Wetland				
Birds				
Pied-billed grebe		B,F,R	B,F,R	B,F,R
Eared grebe		B,F,R	B,F,R	B,F,R
American bittern		B,F,R	B,F,R	B,F,R
Cattle egret		F,R	F,R	B,F,R
Black-crowned night-heron		F,R	F,R	F,R
Snowy egret		B,F,R	B,F,R	B,F,R
White-faced ibis		F,R	B,F,R	B,F,R
Tundra swan		F,R	F,R	F,R
Greater white-fronted goose		F,R	F,R	F,R
Snow goose		F,R	F,R	F,R
Ross's goose		F,R	F,R	F,R
Canada goose		F,R	F,R	F,R
Green-winged teal		F,R	F,R	F,R
Mallard		B,F,R	B,F,R	B,F,R
Northern pintail		F,R	F,R	F,R
Cinnamon teal		B,F,R	B,F,R	B,F,R

Table S-1. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Gadwall		B,F,R	B,F,R	B,F,R
Redhead		B,F,R	B,F,R	B,F,R
Ring-necked duck		F,R	F,R	F,R
Lesser scaup		F,R	F,R	F,R
Greater scaup		F,R	F,R	
Bufflehead		F,R	F,R	F,R
Hooded merganser		F,R	F,R	F,R
Common merganser		F,R	F,R	F,R
Ruddy duck		B,F,R	B,F,R	B,F,R
Black rail		B,F,R	B,F,R	
Virginia rail		B,F,R	B,F,R	B,F,R
Common moorhen		B,F,R	B,F,R	B,F,R
American coot		B,F,R	B,F,R	B,F,R
Sandhill crane		F,R	F,R	F,R
Common snipe		F,R	F,R	F,R
Black tern		B,F,R	B,F,R	
Short-eared owl		B,F,R	B,F,R	B,F,R
Marsh wren		B,F,R	B,F,R	B,F,R
Common yellowthroat		B,F,R	B,F,R	B,F,R
Red-winged blackbird		B,F,R	B,F,R	B,F,R
Tricolored blackbird		B,F,R	B,F,R	B,F,R
Yellow-headed blackbird		B,F,R	B,F,R	B,F,R
Mammals				
Beaver		B,F,R	B,F,R	B,F,R
Muskrat		B,F,R	B,F,R	B,F,R
Coyote		B,F,R	B,F,R	B,F,R
Red fox		B,F,R	B,F,R	B,F,R
Gray fox		B,F,R	B,F,R	B,F,R
River otter		B,F,R	B,F,R	B,F,R
Reptiles				
Western aquatic garter snake		B,F,R	B,F,R	B,F,R
Common garter snake		B,F,R	B,F,R	B,F,R
Western terrestrial garter snake		B,F,R	B,F,R	B,F,R
Amphibians				
Pacific treefrog		B,F,R	B,F,R	B,F,R
Saline Emergent Wetland				
Birds				
Eared grebe	F,R	B,F,R		
Black-crowned night-heron	F,R	F,R		
Snowy egret	F,R	B,F,R		
Mallard	B,F,R	B,F,R		
Northern pintail	F,R	F,R		
Cinnamon teal	B,F,R	B,F,R		
Gadwall	B,F,R	B,F,R		
Redhead	B,F,R	B,F,R		
Lesser scaup	F,R	F,R		
Greater scaup	F,R	F,R		
Bufflehead	F,R	F,R		
Ruddy duck	B,F,R	B,F,R		
Black rail	B,F,R	B,F,R		
Clapper rail	B,F,R	B,F,R		
Virginia rail	F,R	F,R		
Sora	F,R	F,R		
American coot	B,F,R	B,F,R		
Willet	F,R	F,R		

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Whimbrel	F,R	F,R		
Common snipe	F,R	F,R		
Marsh wren	B,F,R	B,F,R		
Common yellowthroat	B,F,R	B,F,R		
Red-winged blackbird	B,F,R	B,F,R		
Tricolored blackbird	F,R	F,R		
Mammals				
Red fox	B,F,R	B,F,R		
Salt marsh harvest mouse	B,F,R	B,F,R		
Deer mouse	B,F,R	B,F,R		
Valley Foothill Riparian				
Birds				
Double-crested cormorant	R			
Great blue heron	B,F,R	B,R	B,R	B,R
Great egret	B,F,R	B,R	B,R	B,R
Green heron	B,F,R			
Wood duck	B,F,R	B,F,R	B,F,R	B,F,R
Hooded merganser	F,R			
Common merganser	B,F,R			
Turkey vulture	B,F,R	R	R	R
Osprey	B,F,R			
White-tailed kite		B,F,R	B,F,R	B,F,R
Bald eagle		R	R	R
Sharp-shinned hawk	F,R	F,R	F,R	F,R
Cooper's hawk	F,R	B,F,R	B,F,R	B,F,R
Red-shouldered hawk	B,F,R	B,F,R	B,F,R	B,F,R
Swainson's hawk	B,F	B,R	B,R	B,R
Red-tailed hawk	B,F,R	B,R	B,R	B,R
American kestrel	B,F	B,F,R	B,F,R	B,F,R
Peregrine falcon	B,F,R			
Prairie falcon	B,F,R			
Merlin		F,R	F,R	F,R
Ring-necked pheasant	R	R	R	
California quail	B,F,R	B,F,R	B,F,R	B,F,R
Mountain quail	F,R			
Wild turkey	B,F,R	B,F,R	B,F,R	B,F,R
Spotted sandpiper		B,F,R	B,F,R	B,F,R
Band-tailed pigeon	F,R	F,R	F,R	F,R
Mourning dove	B,F,R	B,F,R	B,F,R	B,F,R
Yellow-billed cuckoo			B,F,R	
Barn owl	B,F	B,F,R	B,F,R	B,F,R
Western screech owl	B,F,R	B,F,R	B,F,R	B,F,R
Great horned owl	B,F,R	B,F,R	B,F,R	B,F,R
Long-eared owl		B,F,R	B,F,R	B,F,R
Northern pygmy owl	B,F,R			
Northern saw-whet owl	B,F,R			
White-throated swift	B,F			
Black-chinned hummingbird		B,F,R	B,F,R	B,F,R
Anna's hummingbird		B,F,R	B,F,R	B,F,R
Rufous hummingbird		F,R	F,R	F,R
Belted kingfisher	B,F,R	B,F,R	B,F,R	B,F,R
Red-breasted sapsucker	F,R	F,R	F,R	F,R
Nuttall's woodpecker	B,F,R	B,F,R	B,F,R	B,F,R
Downy woodpecker	B,F,R	B,F,R	B,F,R	B,F,R
Hairy woodpecker	B,F,R	F,R	F,R	F,R
Acorn woodpecker	B,F,R			
Northern flicker	B,F,R	B,F,R	B,F,R	B,F,R
Western wood-pewee	B,F,R	F,R	F,R	F,R
Willow flycatcher	B,F,R	F,R	F,R	F,R

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Pacific slope flycatcher		B,F,R	B,F,R	B,F,R
Black phoebe	B,F,R	B,F,R	B,F,R	B,F,R
Ash-throated flycatcher		B,F,R	B,F,R	B,F,R
Purple martin		B,F,R	B,F,R	B,F,R
Tree swallow	B,F,R	B,F,R	B,F,R	B,F,R
Violet-green swallow	B,F,R	B,F,R	B,F,R	B,F,R
Northern rough-winged swallow	B,F,R	B,F,R	B,F,R	B,F,R
Bank swallow	B,F,R	B,F,R	B,F,R	B,F,R
Cliff swallow	B,F,R	B,F,R	B,F,R	B,F,R
Barn swallow		B,F,R	B,F,R	B,F,R
Western scrub jay	B,F,R	B,F,R	B,F,R	B,F,R
Yellow-billed magpie		B,F,R	B,F,R	B,F,R
Common raven	B,F			
American crow		B,F,R	B,F,R	B,F,R
Plain titmouse	B,F,R	B,F,R	B,F,R	B,F,R
Bushtit	B,F,R	B,F,R	B,F,R	B,F,R
White-breasted nuthatch	B,F,R	B,F,R	B,F,R	B,F,R
Brown creeper		B,F,R	B,F,R	B,F,R
Winter wren	B,F,R			
Bewick's wren	B,F,R	B,F,R	B,F,R	B,F,R
House wren	B,F,R	B,F,R	B,F,R	B,F,R
Canyon wren	B,F,R			
Golden-crowned kinglet		F,R	F,R	F,R
Ruby-crowned kinglet	B,F	F,R	F,R	F,R
Blue-gray gnatcatcher			F,R	F,R
Western bluebird		B,F,R	B,F,R	B,F,R
Swainson's thrush	B,F,R	F,R	F,R	F,R
Hermit thrush	F,R	F,R	F,R	F,R
Varied thrush	F,R			
American robin		B,F,R	B,F,R	B,F,R
Wrentit		B,F,R	B,F,R	B,F,R
Northern mockingbird		B,F,R	B,F,R	B,F,R
Cedar waxwing		F,R	F,R	F,R
European starling	B,F,R	B,F,R	B,F,R	B,F,R
Hutton's vireo	B,F,R	B,F,R	B,F,R	B,F,R
Warbling vireo	B,F,R	F,R	F,R	F,R
Orange-crowned warbler	B,F,R	B,F,R	B,F,R	B,F,R
Nashville warbler		F,R	F,R	F,R
Yellow warbler	B,F,R	F,R	F,R	F,R
Yellow-rumped warbler	F,R	F,R	F,R	F,R
Black-throated gray warbler	F,R	F,R	F,R	F,R
Common yellowthroat		B,F,R	B,F,R	B,F,R
Hermit warbler	F,R			
Wilson's warbler	B,F,R			
Yellow-breasted chat	F,R	B,F,R	B,F,R	B,F,R
Western tanager	F,R	F,R	F,R	F,R
Black-headed grosbeak	B,F,R	B,F,R	B,F,R	B,F,R
Blue grosbeak		B,F,R	B,F,R	B,F,R
Lazuli bunting	B,F,R	B,F,R	B,F,R	B,F,R
Spotted towhee		B,F,R	B,F,R	B,F,R
California towhee		B,F,R	B,F,R	B,F,R
Chipping sparrow		F,R	F,R	F,R
Lark sparrow		B,F,R	B,F,R	B,F,R
Fox sparrow		F,R	F,R	F,R
Song sparrow		B,F,R	B,F,R	B,F,R
Lincoln's sparrow		F,R	F,R	F,R
Golden-crowned sparrow		F,R	F,R	F,R
White-crowned sparrow		F,R	F,R	F,R
Dark-eyed junco		F,R	F,R	F,R
Red-winged blackbird	B,F,R	B,F,R	B,F,R	
Brown-headed cowbird		B,F,R	B,F,R	B,F,R

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Brewer's blackbird	B,F,R			
Northern oriole		B,F,R	B,F,R	B,F,R
Bullock's oriole	B,F,R			
House finch		B,F,R	B,F,R	B,F,R
Purple finch		F,R	F,R	F,R
Pine siskin		F,R	F,R	F,R
Lawrence's goldfinch		B,F,R	B,F,R	B,F,R
Lesser goldfinch		B,F,R	B,F,R	B,F,R
American goldfinch		B,F,R	B,F,R	B,F,R
Mammals				
Virginia opossum	B,F,R	B,F,R	B,F,R	B,F,R
Ornate shrew	B,F,R	B,F,R	B,F,R	B,F,R
Broad-footed mole	B,F,R	B,F,R	B,F,R	B,F,R
Yuma myotis	R	B,F,R	B,F,R	B,F,R
California myotis		B,F,R	B,F,R	B,F,R
Long-eared myotis	B,F,R			
Fringed myotis	R			
Western pipistrelle	B,F,R	B,F,R	B,F,R	
Big brown bat	B,F,R	B,F,R	B,F,R	B,F,R
Red bat		B,F,R	B,F,R	B,F,R
Hoary bat		B,F,R	B,F,R	B,F,R
Townsend's big-eared bat		B,F,R	B,F,R	B,F,R
Pallid bat		B,F,R	B,F,R	B,F,R
Brazilian free-tailed bat		B,F,R	B,F,R	B,F,R
Brush rabbit		B,F,R	B,F,R	B,F,R
Desert cottontail		B,F,R	B,F,R	B,F,R
Black-tailed hare		B,F,R	B,F,R	B,F,R
California ground squirrel		B,F,R	B,F,R	B,F,R
Western gray squirrel	B,F,R	B,F,R	B,F,R	B,F,R
Botta's pocket gopher		B,F,R	B,F,R	B,F,R
Beaver	B,F,R	B,F,R	B,F,R	B,F,R
Western harvest mouse		B,F,R	B,F,R	B,F,R
Deer mouse		B,F,R	B,F,R	B,F,R
Dusky-footed woodrat		B,F,R	B,F,R	B,F,R
California vole		B,F,R	B,F,R	B,F,R
Muskrat	B,F,R	B,F,R	B,F,R	B,F,R
Black rat		B,F,R	B,F,R	B,F,R
Norway rat		B,F,R	B,F,R	B,F,R
House mouse		B,F,R	B,F,R	B,F,R
Porcupine		B,F,R	B,F,R	
Coyote	B,F,R	B,F,R	B,F,R	B,F,R
Red fox		B,F,R	B,F,R	B,F,R
Ringtail		B,F,R	B,F,R	B,F,R
Black bear	B,F,R			
Raccoon	B,F,R	B,F,R	B,F,R	B,F,R
Long-tailed weasel		B,F,R	B,F,R	B,F,R
Mink	B,F,R	B,F,R	B,F,R	B,F,R
Western spotted skunk		B,F,R	B,F,R	B,F,R
Striped skunk	B,F,R	B,F,R	B,F,R	B,F,R
River otter	B,F,R	B,F,R	B,F,R	B,F,R
Bobcat		B,F,R	B,F,R	B,F,R
Mule deer	B,F,R	B,F,R	B,F,R	B,F,R
Mountain lion	B,F,R			
Wild pig	B,F,R			
Elk	B,F			
Reptiles				
Western pond turtle	B,F,R	B,F,R	B,F,R	B,F,R
Western fence lizard	B,F,R	B,F,R	B,F,R	B,F,R
Coast horned lizard		B,F,R	B,F,R	B,F,R
Western skink	B,F,R			

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Gilbert's skink	B,F,R	B,F,R	B,F,R	B,F,R
Western whiptail		B,F,R	B,F,R	B,F,R
Southern alligator lizard	B,F,R	B,F,R	B,F,R	B,F,R
Ringneck snake	B,F,R	B,F,R	B,F,R	
Racer		B,F,R	B,F,R	
Sharp-tailed snake	B,F,R			
Gopher snake	B,F,R	B,F,R	B,F,R	B,F,R
Common kingsnake	B,F,R	B,F,R	B,F,R	B,F,R
Common garter snake	B,F,R	B,F,R	B,F,R	B,F,R
Western terrestrial garter snake	B,F,R	B,F,R	B,F,R	B,F,R
Western aquatic garter snake		B,F,R	B,F,R	B,F,R
Giant two-striped garter snake	B,F,R			
Western rattlesnake	B,F,R	B,F,R	B,F,R	B,F,R
Amphibians				
Red-bellied newt	B,F,R			
Rough-skinned newt	B,F,R			
Black salamander	B,F,R			
California giant salamander	B,F,R			
Ensatina	B,F,R			
California slender salamander	B,F,R	B,F,R	B,F,R	B,F,R
Western toad		B,F,R		B,F,R
			B,F,R	
Pacific treefrog	B,F,R	B,F,R	B,F,R	B,F,R
Foothill yellow-legged frog	F,R		B,F,R	B,F,R
Bullfrog	B,F,R	B,F,R	B,F,R	B,F,R
Montane Riparian				
Birds				
Great blue heron			B, F	
Black-crowned night heron			B, F	
Wood duck			B,F,R	
Common merganser			B,F	
Turkey vulture			B,F	
Osprey			B,F,R	
Sharp-shinned hawk			B,F,R	
Cooper's hawk			B,F,R	
Northern goshawk			B,F,R	
Red-shouldered hawk			B,F,R	
Red-tailed hawk			B,F,R	
Golden eagle			B,F,R	
American kestrel			B,F,R	
Peregrine falcon			B,F,R	
Prairie falcon			B,F,R	
Ruffed grouse			B,F,R	
Mountain quail			B,F,R	
Bank-tailed pigeon			B,F,R	
Mourning dove			B,F,R	
Barn owl			B,F	
Western screech owl			B,F,R	
Great horned owl			B,F,R	
Northern pygmy owl			B,F,R	
Long-eared owl			B,F,R	
Northern saw-whet owl			B,F,R	
Black swift			B,F,R	
White-throated swift			B,F,R	
Belted kingfisher			B,F,R	
Acorn woodpecker			R	
Red-naped sapsucker			B,F,R	

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Red-breasted sapsucker			B,F,R	
Williamson's sapsucker			B,F,R	
Nuttall's woodpecker			B,F,R	
Downy woodpecker			B,F,R	
Hairy woodpecker			B,F,R	
Northern flicker			B,F,R	
Western wood-pewee			B,F,R	
Willow flycatcher			B,F,R	
Hammond's flycatcher			B,F,R	
Dusky flycatcher			B,F,R	
Pacific-slope flycatcher			B,F,R	
Black phoebe			B,F,R	
Purple martin			R	
Tree swallow			B,F,R	
Violet-green swallow			B,F,R	
Northern rough-winged swallow			B,F,R	
Bank swallow			B,F,R	
Steller's jay			B,F,R	
Black-billed magpie			B,F,R	
Common raven			B,F,R	
White-breasted nuthatch			B,F,R	
Canyon wren			B,F,R	
Bewick's wren			B,F,R	
House wren			B,F,R	
Winter wren			B,F,R	
American dipper			B,F,R	
Western bluebird			B,F,R	
Swainson's thrush			B,F,R	
Hermit thrush			B,F,R	
Varied thrush			F,R	
Solitary vireo			B,F,R	
Hutton's vireo			B,F,R	
Warbling vireo			B,F,R	
Orange-crowned warbler			B,F,R	
Nashville warbler			B,F,R	
Yellow warbler			B,F,R	
Yellow-rumped warbler			B,F,R	
Macgillivray's warbler			B,F,R	
Wilson's warbler			F,R	
Western tanager			B,F,R	
Black-headed grosbeak			B,F,R	
Lazuli bunting			B,F,R	
Mammals				
Vagrant shrew			B,F,R	
Ornate shrew			B,F,R	
Water shrew			B,F,R	
Broad-footed mole			B,F,R	
Long-eared myotis			B,F,R	
Long-legged myotis			B,F,R	
Big brown bat			B,F,R	
Snowshoe hare			B,F,R	
Mountain beaver			B,F,R	
Northern flying squirrel			B,F,R	
American beaver			B,F,R	
Western harvest mouse			B,F,R	
Common muskrat			B,F,R	
Western jumping mouse			B,F,R	
Coyote			B,F,R	
Black bear			B,F,R	
Raccoon			B,F,R	

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
American marten			B,F,R	
Fisher			B,F,R	
Mink			B,F,R	
Striped skunk			B,F,R	
Mountain lion			B,F,R	
Mule deer			B,F,R	
Reptiles				
Southern alligator lizard			B,F,R	
Rubber boa			B,F,R	
Ringneck snake			B,F,R	
Sharp-tailed snake			B,F,R	
Gopher snake			B,F,R	
Amphibians				
California giant salamander			B,F,R	
Rough-skinned newt			B,F,R	
Ensatina			B,F,R	
Black salamander			B,F,R	
Tailed frog			B,F,R	
Pacific treefrog			B,F,R	
California mountain kingsnake			B,F,R	
Western terrestrial garter snake			B,F,R	
Grassland				
Birds				
White-tailed kite	F,R	F,R	F,R	F,R
Northern harrier	B,F,R	B,F,R	B,F,R	B,F,R
Red-tailed hawk	B,F,R	B,F,R	B,F,R	B,F,R
Swainson's hawk	F,R	F,R	F,R	F,R
Ferruginous hawk	F,R	F,R	F,R	F,R
Rough-legged hawk	F,R	F,R	F,R	F,R
Golden eagle	F,R	F,R	F,R	F,R
American kestrel	F,R	F,R	F,R	F,R
Prairie falcon	F,R	F,R	F,R	F,R
Ring-necked pheasant	B,F,R	B,F,R	B,F,R	B,F,R
Sandhill crane		F,R	F,R	F,R
Mourning dove	F,R	F,R	F,R	F,R
Barn owl	F,R	F,R	F,R	F,R
Burrowing owl	B,F,R	B,F,R	B,F,R	B,F,R
Short-eared owl	B,F,R	B,F,R	B,F,R	B,F,R
Say's phoebe	B,F,R	B,F,R	B,F,R	B,F,R
Western kingbird	F,R	F,R	F,R	F,R
Horned lark	B,F,R	B,F,R	B,F,R	B,F,R
Loggerhead shrike	F,R	F,R	F,R	F,R
Savannah sparrow	F,R	F,R	F,R	F,R
Golden-crowned sparrow	F,R	F,R	F,R	F,R
White-crowned sparrow	F,R	F,R	F,R	F,R
Dark-eyed junco	F,R	F,R	F,R	F,R
Red-winged blackbird	F,R	F,R	F,R	F,R
Western meadowlark	B,F,R	B,F,R	B,F,R	B,F,R
Brewer's blackbird	F,R	F,R	F,R	F,R
Brown-headed cowbird	F,R	F,R	F,R	F,R
House finch	F,R	F,R	F,R	F,R
Lesser goldfinch	F,R	F,R	F,R	F,R
American goldfinch	F,R	F,R	F,R	F,R
Lawrence's goldfinch	F,R	F,R	F,R	F,R
House sparrow	F,R	F,R	F,R	F,R

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Mammals				
Ornate shrew	B,F,R	B,F,R	B,F,R	B,F,R
Broad-footed mole	B,F,R	B,F,R	B,F,R	B,F,R
Yuma myotis	F,R	F,R	F,R	F,R
California myotis	B,F,R	B,F,R	B,F,R	B,F,R
Western pipistrelle	F,R	F,R	F,R	F,R
Big brown bat	B,F,R	B,F,R	B,F,R	B,F,R
Red bat	B,F,R	B,F,R	B,F,R	B,F,R
Hoary bat	B,F,R	B,F,R	B,F,R	B,F,R
Townsend's big-eared bat	F,R	F,R	F,R	F,R
Pallid bat	B,F,R	B,F,R	B,F,R	B,F,R
Brazilian free-tailed bat	F,R	F,R	F,R	F,R
Desert cottontail	B,F,R	B,F,R	B,F,R	B,F,R
Black-tailed hare	B,F,R	B,F,R	B,F,R	B,F,R
California ground squirrel	B,F,R	B,F,R	B,F,R	B,F,R
Botta's pocket gopher	B,F,R	B,F,R	B,F,R	B,F,R
San Joaquin pocket mouse	B,F,R	B,F,R	B,F,R	B,F,R
Heerman's kangaroo rat	B,F,R	B,F,R		B,F,R
California kangaroo rat	B,F,R		B,F,R	
Western harvest mouse	B,F,R	B,F,R	B,F,R	B,F,R
Deer mouse	B,F,R	B,F,R	B,F,R	B,F,R
California vole	B,F,R	B,F,R	B,F,R	B,F,R
House mouse	B,F,R	B,F,R	B,F,R	B,F,R
Kit fox		B,F,R		B,F,R
Coyote	B,F,R	B,F,R	B,F,R	B,F,R
Red fox	B,F,R	B,F,R	B,F,R	B,F,R
Gray fox	B,F,R	B,F,R	B,F,R	B,F,R
Racoon	B,F,R	B,F,R	B,F,R	B,F,R
Badger	B,F,R	B,F,R	B,F,R	B,F,R
Striped skunk	B,F,R	B,F,R	B,F,R	B,F,R
Bobcat	B,F,R	B,F,R	B,F,R	B,F,R
Mule deer	B,F,R	B,F,R	B,F,R	B,F,R
Wild pig	B,F,R	B,F,R	B,F,R	B,F,R
Reptiles				
Western pond turtle	F,R	F,R	F,R	F,R
Western fence lizard	B,F,R	B,F,R	B,F,R	B,F,R
Coast horned lizard	B,F,R	B,F,R	B,F,R	B,F,R
Western whiptail	B,F,R	B,F,R	B,F,R	B,F,R
Southern alligator lizard	B,F,R	B,F,R	B,F,R	B,F,R
Racer	B,F,R	B,F,R	B,F,R	B,F,R
Coachwhip	B,F,R	B,F,R	B,F,R	B,F,R
Gopher snake	B,F,R	B,F,R	B,F,R	B,F,R
Common kingsnake	B,F,R	B,F,R	B,F,R	B,F,R
Long-nosed snake		B,F,R	B,F,R	B,F,R
Common garter snake	B,F,R	B,F,R	B,F,R	B,F,R
Western terrestrial garter snake	B,F,R	B,F,R	B,F,R	
Western rattlesnake	B,F,R	B,F,R	B,F,R	B,F,R
Amphibians				
Tiger salamander	F,R	F,R	F,R	F,R
Western spadefoot	F,R	F,R	F,R	F,R
Western toad	F,R	F,R	F,R	F,R
Pacific treefrog	F,R	F,R	F,R	F,R
Red-legged frog	F,R	F,R	F,R	F,R
Valley Foothill Hardwood				
Birds				
Great blue heron			B,F	B,F
Great egret			B,F	B,F

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Black-crowned night heron			B,F	B,F
Wood duck			B,F,R	B,F,R
Turkey vulture			B,F,R	B,F,R
White-tailed kite		B,F,R	B,F,R	B,F,R
Sharp-shinned hawk		F,R	F,R	F,R
Cooper's hawk		B,F,R	B,F,R	B,F,R
Red-shouldered hawk		B,F,R	B,F,R	B,F,R
Red-tailed hawk			B,F,R	B,F,R
Swainson's hawk		B,F,R	B,F,R	B,F,R
Golden eagle			B,F,R	B,F,R
American kestrel			B,F,R	B,F,R
Peregrine flacon			B,F,R	B,F,R
Prairie falcon			B,F	B,F
Wild turkey		B,F,R	B,F,R	B,F,R
California quail		B,F,R	B,F,R	B,F,R
Mountain quail			B,F,R	
Band-tailed pigeon			B,F,R	B,F,R
Mourning dove		B,F,R	B,F,R	B,F,R
Greater roadrunner				B,F
Barn owl			B,F	B,F
Great horned owl			B,F,R	B,F,R
Northern pygmy owl			B,F,R	B,F,R
Spotted owl			B,F,R	
Northern saw-whet owl			B,F,R	B,F,R
Western screech owl		B,F,R	B,F,R	B,F,R
Long-eared owl		B,F,R	B,F,R	B,F,R
Lesser nighthawk			F,R	F,R
Common nighthawk			R	R
Common poorwill			R	R
White-throated swift			B,F,R	B,F,R
Anna's hummingbird		B,F,R	B,F,R	B,F,R
Lewis' woodpecker		B,F,R	B,F,R	B,F,R
Acorn woodpecker		B,F,R	B,F,R	B,F,R
Nutall's woodpecker		B,F,R	B,F,R	B,F,R
Hairy woodpecker			B,F,R	B,F,R
Red-breasted sapsucker			F,R	F,R
Northern flicker		B,F,R	B,F,R	B,F,R
Western wood-pewee			B,F,R	B,F,R
Pacific-slope flycatcher			B,F,R	B,F,R
Ash-throated flycatcher		B,F,R	B,F,R	B,F,R
Western kingbird		B,F,R	B,F,R	B,F,R
Purple martin			B,F,R	B,F,R
Tree swallow		B,F,R	B,F,R	B,F,R
Violet-green swallow		B,F,R	B,F,R	B,F,R
Northern rough-winged swallow			B,F,R	B,F,R
Western scrub jay		B,F,R	B,F,R	B,F,R
Yellow-billed magpie		B,F,R	B,F,R	B,F,R
American crow		B,F,R	B,F,R	B,F,R
Common raven			B,F,R	B,F,R
Plain titmouse		B,F,R	B,F,R	B,FR
Bushtit		B,F,R	B,F,R	B,F,R
White-breasted nuthatch		F,R	F,R	F,R
Rock wren			B,F	B,F
Bewick's wren		B,F,R	B,F,R	B,F,R
House wren		B,F,R	B,F,R	B,F,R
Ruby-crowned kinglet			F,R	F,R
Blue-gray gnatcatcher			B,F,R	B,F,R
Western bluebird		B,F,R	B,F,R	B,F,R
American robin		B,F,R	B,F,R	B,F,R
Varied thrush		F,R	F,R	F,R

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Hermit thrush		F,R	F,R	F,R
Northern mockingbird		B,F,R	B,F,R	B,F,R
Loggerhead shrike			B,F,R	B,F,R
European starling		B,F,R	B,F,R	B,F,R
Hutton's vireo			B,F,R	B,F,R
Warbling vireo		B,F,R	B,F,R	B,F,R
Orange-crowned warbler		B,F,R	B,F,R	B,F,R
Yellow warbler			F,R	F,R
Yellow-rumped warbler		F,R	F,R	F,R
Black throated gray warbler			F,R	F,R
Townsend's warbler			F,R	
Hermit warbler			F,R	F,R
Wilson's warbler			F,R	F,R
Western tanager			F,R	F,R
Black-headed grosbeak		B,F,R	B,F,R	B,F,R
Blue grosbeak		B,F,R	B,F,R	B,F,R
Spotted towhee		B,F,R	B,F,R	B,F,R
Bullock's oriole			B,F,R	B,F,R
Lark sparrow		B,F,R	B,F,R	B,F,R
Golden-crowned sparrow		F,R	F,R	F,R
White-crowned sparrow		F,R	F,R	F,R
Dark-eyed junco		F,R	F,R	F,R
Northern oriole		B,F,R	B,F,R	B,F,R
House finch		B,F,R	B,F,R	B,F,R
Lesser goldfinch		B,F,R	B,F,R	B,F,R
American goldfinch		F,R	F,R	F,R
House sparrow		B,F,R	B,F,R	B,F,R
Mammals				
Virginia oppossum		B,F,R	B,F,R	B,F,R
Ornate shrew		B,F,R	B,F,R	B,F,R
Trowbridges shrew		B,F,R		
Broad-footed mole		B,F,R	B,F,R	B,F,R
Yuma myotis		F,R	F,R	F,R
Fringed myotis			B,F,R	B,F,R
California myotis		B,F,R	B,F,R	B,F,R
Western pipistrelle		F,R	F,R	F,R
Big brown bat		B,F,R	B,F,R	B,F,R
Red bat		B,F,R	B,F,R	B,F,R
Hoary bat		B,F,R	B,F,R	B,F,R
Townsend's big-eared bat		F,R	F,R	F,R
Pallid bat		B,F,R	B,F,R	B,F,R
Brazilian free-tailed bat		F,R	F,R	F,R
Desert cottontail		B,F,R	B,F,R	B,F,R
Black-tailed hare		B,F,R	B,F,R	B,F,R
Western gray squirrel				B,F,R
California ground squirrel		B,F,R	B,F,R	B,F,R
Botta's pocket gopher		B,F,R	B,F,R	B,F,R
Heerman's kangaroo rat		B,F,R		B,F,R
Western harvest mouse		B,F,R	B,F,R	B,F,R
Deer mouse		B,F,R	B,F,R	B,F,R
Dusky-footed woodrat		B,F,R	B,F,R	B,F,R
California vole		B,F,R	B,F,R	B,F,R
California mouse				B,F,R
House mouse		B,F,R	B,F,R	B,F,R
Coyote		B,F,R	B,F,R	B,F,R
Gray fox		B,F,R	B,F,R	B,F,R
Black bear			B,F,R	
Ringtail		B,F,R	B,F,R	B,F,R
Racoon		B,F,R	B,F,R	B,F,R
Mountain lion			B,F,R	

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Long-tailed weasel		B,F,R	B,F,R	B,F,R
Badger		B,F,R	B,F,R	B,F,R
Striped skunk		B,F,R	B,F,R	B,F,R
Bobcat		B,F,R	B,F,R	B,F,R
Mule deer		B,F,R	B,F,R	B,F,R
Wild pig		B,F,R	B,F,R	B,F,R
Reptiles				
Western pond turtle		F,R	F,R	F,R
Western fence lizard		B,F,R	B,F,R	B,F,R
Coast horned lizard		B,F,R	B,F,R	B,F,R
Western skink		B,F,R	B,F,R	B,F,R
Gilbert's skink				B,F,R
Western whiptail		B,F,R	B,F,R	B,F,R
Southern alligator lizard		B,F,R	B,F,R	B,F,R
California legless lizard		B,F,R	B,F,R	B,F,R
Ringneck snake		B,F,R		
Sharp-tailed snake		B,F,R		
Western terrestrial garter snake			B,F,R	B,F,R
Giant two-striped garter snake			B,F,R	B,F,R
Racer		B,F,R	B,F,R	B,F,R
Coachwip		B,F,R	B,F,R	B,F,R
Gopher snake		B,F,R	B,F,R	B,F,R
Common kingsnake		B,F,R	B,F,R	B,F,R
Long-nosed snake		B,F,R	B,F,R	B,F,R
Common garter snake		B,F,R	B,F,R	B,F,R
Western terrestrial garter snake		B,F,R	B,F,R	
Western rattlesnake		B,F,R	B,F,R	B,F,R
Amphibians				
Tiger salamander		F,R	F,R	F,R
Rough skinned newt			F,R	
Red-bellied newt			B,F,R	
Ensatina			B,F,R	B,F,R
California newt		F,R	F,R	F,R
Black bellied-slender salamander				B,F,R
Pacific slender salamander				B,F,R
California slender salamander		B,F,R		
Arboreal salamander			B,F,R	B,F,R
Shasta salamander			B,F,R	
Slender salamander		B,F,R	B,F,R	B,F,R
Western spadefoot		F,R	F,R	F,R
Western toad		F,R	F,R	F,R
Pacific treefrog		F,R	F,R	F,R
Red-legged frog		F,R	F,R	F,R
Chaparral				
Birds				
Turkey vulture			B,F,R	
Sharp-shinned hawk			F,R	
Golden eagle			B,F,R	
Peregrine falcon			B,F,R	
Prairie falcon			B,F	
White-tailed kite			B,F,R	
California quail			B,F,R	
Barn owl			B,F	

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Western screech owl			F,R	
Long-eared owl			F,R	
Common nighthawk			R	
Black swift			R	
White-throated swift			B,F,R	
Anna's hummingbird			B,F,R	
Calliope hummingbird			F,R	
Dusky flycatcher			B,F,R	
Northern rough-winged swallow			B,F,R	
Common raven			B,F,R	
Bushtit			B,F,R	
Rock wren			B,F	
Bewick's wren			B,F,R	
House wren			B,F,R	
Wrentit			B,F,R	
Ruby-crowned kinglet			F,R	
Northern mocking bird			B,F,R	
American robin			R	
California thrasher			B,F,R	
Orange-crowned warbler			F,R	
Nashville warbler			B,F,R	
Yellow warbler			B,F,R	
Lazuli bunting			B,F,R	
Green-tailed towhee			B,F,R	
Spotted towhee			B,F,R	
Brewer's sparrow			B,F,R	
Black-chinned sparrow			B,F,R	
Fox sparrow			B,F,R	
Sage sparrow			B,F,R	
Mammals				
Big brown bat			B,F,R	
Brush rabbit			B,F,R	
Desert cottontail			B,F,R	
Yellow-pine chipmunk			B,F,R	
Sonoma chipmunk			B,F,R	
Deer mouse			B,F,R	
Brush mouse			B,F,R	
Pinyon mouse			B,F,R	
Dusky-footed woodrat			B,F,R	
Coyote			B,F,R	
Gray fox			B,F,R	
Ringtail			B,F,R	
Western spotted skunk			B,F,R	
Striped skunk			B,F,R	
Mountain lion			B,F,R	
Bobcat			B,F,R	
Wild pig			B,F,R	
Elk			B,F,R	
Mule deer			B,F,R	
Reptiles				
Western fence lizard			B,F,R	
Southern alligator lizard			B,F,R	
Northern alligator lizard			B,F,R	
Ringneck snake			B,F,R	
Sharp-tailed snake			B,F,R	
California whipsnake			B,F,R	
Common kingsnake			B,F,R	
Common garter snake			B,F,R	

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Giant two-stripped garter snake			B,F,R	
Western rattlesnake			B,F,R	
Amphibians				
California newt			B,F,R	
Montane Hardwood				
Birds				
Turkey vulture			B,F	
Sharp-shinned hawk			B,F,R	
Cooper's hawk			B,F,R	
Northern goshawk			B,F,R	
Red-tailed hawk			B,F,R	
Golden eagle			B,F,R	
American kestrel			B,F,R	
Peregrine falcon			B,F,R	
Prairie falcon			B,F,R	
Ruffed grouse			B,F,R	
Wild turkey			B,F,R	
Mountain quail			B,F,R	
Band-tailed pigeon			B,F,R	
Mourning dove			B,F,R	
Barn owl			B,F	
Flammulated owl			B,F,R	
Western screech owl			B,F,R	
Great horned owl			B,F,R	
Northern pygmy owl			B,F,R	
Spotted owl			B,F,R	
Northern saw-whet owl			B,F,R	
White-throated swift			B,F,R	
Acorn woodpecker			B,F,R	
Red-breasted sapsucker			B,F,R	
Nuttall's woodpecker			B,F,R	
Hairy woodpecker			B,F,R	
Northern flicker			B,F,R	
Western wood-pewee			B,F,R	
Hammond's flycatcher			B,F,R	
Pacific-slope flycatcher			B,F,R	
Purple martin			B,F	
Violet-green swallow			B,F,R	
Northern rough-winged swallow			B,F,R	
Steller's jay			B,F,R	
Common raven			B,F,R	
Plain titmouse			B,F,R	
White-breasted nuthatch			B,F,R	
Rock wren			B,F	
Ruby-crowned kinglet			B,F,R	
Western bluebird			B,F,R	
Townsend's solitaire			F,R	
Hermit thrush			B,F,R	
Solitary vireo			B,F,R	
Hutton's vireo			B,F,R	
Warbling vireo			B,F,R	
Orange-crowned warbler			F,R	
Nashville warbler			B,F,R	
Yellow-rumped warbler			F,R	
Black-throated gray warbler			B,F,R	
Western tanager			B,F,R	

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Black-headed grosbeak			B,F,R	
Purple finch			B,F,R	
Mammals				
Long-legged myotis			B,F,R	
Big brown bat			B,F,R	
Western gray squirrel			B,F,R	
Dusky-footed woodrat			B,F,R	
Bushy-tailed woodrat			B,F,R	
Coyote			B,F,R	
Gray fox			B,F,R	
Black bear			B,F,R	
Raccoon			B,F,R	
Mountain lion			B,F,R	
Wild pig			B,F,R	
Mule deer			B,F,R	
Reptiles				
Northern alligator lizard			B,F,R	
Rubber boa			B,F,R	
Mixed Hardwood/Conifer				
Birds				
Turkey vulture			B,F	
Osprey			B,F,R	
Sharp-shinned hawk			B,F,R	
Cooper's hawk			B,F,R	
Northern goshawk			B,F,R	
Red-tailed hawk			B,F,R	
Golden eagle			B,F,R	
American kestrel			B,F,R	
Peregrine falcon			B,F,R	
Prairie falcon			B,F	
Wild turkey			B,F,R	
Mountain quail			B,F,R	
Band-tailed pigeon			B,F,R	
Mourning dove			B,F,R	
Barn owl			B,F	
Flammulated owl			B,F,R	
Western screech owl			B,F,R	
Great horned owl			B,F,R	
Northern pygmy owl			B,F,R	
Spotted owl			B,F,R	
Northern saw-whet owl			B,F,R	
Common nighthawk			R	
Black swift			B,F,R	
White-throated swift			B,F,R	
Acorn woodpecker			B,F,R	
Red-breasted sapsucker			B,F,R	
Nuttall's woodpecker			B,F,R	
Hairy woodpecker			B,F,R	
Northern flicker			B,F,R	
Pileated woodpecker			B,F,R	
Olive-sided flycatcher			B,F,R	
Western wood-pewee			B,F,R	
Hammond's flycatcher			B,F,R	
Dusky flycatcher			B,F,R	
Pacific-slope cordilleran flycatcher			B,F,R	
Purple martin			B,F	

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Violet-green swallow			B,F,R	
Northern rough-winged swallow			B,F,R	
Steller's jay			B,F,R	
Common raven			B,F,R	
Mountain chickadee			B,F,R	
Plain titmouse			B,F,R	
White-breasted nuthatch			B,F,R	
Brown creeper			B,F,R	
Rock wren			B,F	
Winter wren			B,F,R	
Golden-crowned kinglet			B,F,R	
Ruby-crowned kinglet			F,R	
Western bluebird			B,F,R	
Hermit thrush			B,F,R	
Wrentit			F,R	
Solitary vireo			B,F,R	
Hutton's vireo			B,F,R	
Warbling vireo			B,F,R	
Orange-crowned warbler			F,R	
Nashville warbler			B,F,R	
Yellow-rumped warbler			B,F,R	
Western tanager			B,F,R	
Black-headed grosbeak			B,F,R	
Purple finch			B,F,R	
Mammals				
Trowbridge's shrew			B,F,R	
Long-eared myotis			B,F,R	
Long-legged myotis			B,F,R	
Big brown bat			B,F,R	
Douglas' squirrel			B,F,R	
Western gray squirrel			B,F,R	
Deer mouse			B,F,R	
Coyote			B,F,R	
Gray fox			B,F,R	
Black bear			B,F,R	
Raccoon			B,F,R	
American marten			B,F,R	
Fisher			B,F,R	
Mountain lion			B,F,R	
Elk			B,F	
Mule deer			B,F,R	
Reptiles				
Northern alligator lizard			B,F,R	
Rubber boa			B,F,R	
Amphibians				
Rough-skinned newt			F,R	
Tailed frog			F,R	
Ponderosa Pine				
Birds				
Great blue heron			B,F	
Turkey vulture			B,F	
Osprey			B,F,R	
Bald eagle			B,F,R	
Sharp-shinned hawk			B,F,R	
Northern goshawk			B,F,R	
Red-tailed hawk			B,F,R	

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Golden eagle			B,F,R	
American kestrel			B,F,R	
Peregrine falcon			B,F,R	
Prairie falcon			B,F	
Mountain quail			B,F,R	
Band-tailed pigeon			B,F,R	
Mourning dove			B,F,R	
Flammulated owl			B,F,R	
Great horned owl			B,F,R	
Northern pygmy owl			B,F,R	
Spotted owl			B,F,R	
Northern saw-whet owl			B,F,R	
Common nighthawk			R	
White-throated swift			B,F,R	
Acorn woodpecker			R	
Red-breasted sapsucker			B,F,R	
Williamson's sapsucker			F,R	
Hairy woodpecker			B,F,R	
White-headed woodpecker			B,F,R	
Northern flicker			B,F,R	
Pileated woodpecker			B,F,R	
Western wood-pewee			B,F,R	
Dusky flycatcher			B,F,R	
Pacific-slope flycatcher			B,F,R	
Purple martin			B,F	
Violet-green swallow			B,F,R	
Northern rough-winged swallow			B,F,R	
Steller's jay			B,F,R	
Common raven			B,F,R	
Mountain chickadee			B,F,R	
Plain titmouse			B,F,R	
Red-breasted nuthatch			B,F,R	
White-breasted nuthatch			B,F,R	
Pygmy nuthatch			B,F,R	
Brown creeper			F,R	
Golden-crowned kinglet			B,F,R	
Ruby-crowned kinglet			F,R	
Townsend's solitaire			B,F,R	
Solitary vireo			B,F,R	
Nashville warbler			B,F,R	
Yellow warbler			B,F,R	
Yellow-rumped warbler			B,F,R	
Black-throated gray warbler			B,F,R	
Hermit warbler			B,F,R	
Western tanager			B,F,R	
Red crossbill			B,F,R	
Mammals				
Trowbridge's shrew			B,F,R	
Long-eared myotis			B,F,R	
Long-legged myotis			B,F,R	
Black-tailed hare			B,F,R	
Yellow-pine chipmunk			B,F,R	
Allen's chipmunk			B,F,R	
Western gray squirrel			B,F,R	
Douglas' squirrel			B,F,R	
Coyote			B,F,R	
Black bear			B,F,R	
Raccoon			B,F,R	
Fisher			B,F,R	

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Mountain lion			B,F,R	
Mule deer			B,F,R	
Reptiles				
Rubber boa			B,F,R	
Western rattlesnake			B,F,R	
Amphibians				
Tailed frog			F,R	
Agriculture - Wetland				
Birds				
Pied-billed grebe	B,F,R	B,F,R	B,F,R	B,F,R
Great egret	F,R	F,R	F,R	F,R
Great blue heron	F,R	F,R	F,R	F,R
Black-cronwned night-heron	F,R	F,R	F,R	F,R
American bittern	B,F,R	B,F,R	B,F,R	B,F,R
Snowy egret	F,R	F,R	F,R	F,R
White-faced ibis	F,R	F,R	F,R	F,R
Tundra swan	F,R	F,R	F,R	F,R
Canada goose	F,R	F,R	F,R	F,R
Ross's goose	F,R	F,R	F,R	F,R
Snow goose	F,R	F,R	F,R	F,R
White-fronted goose	F,R	F,R	F,R	F,R
Green-winged teal	R	F,R	F,R	F,R
Mallard	B,F,R	B,F,R	B,F,R	B,F,R
Northern pintail	F,R	F,R	F,R	F,R
Northern shoveler	F,R	F,R	F,R	F,R
Cinnamon teal	B,F,R	B,F,R	B,F,R	
Gadwall	B,F	B,F,R	B,F,R	B,F,R
American widgeon	F,R	F,R	F,R	F,R
Turkey vulture	R	F,R	F,R	F,R
Northern harrier	B,F,R	F,R	F,R	F,R
White-tailed kite	F,R	F,R	F,R	F,R
Swainson's hawk	B,F,R	F,R	F,R	F,R
Ring-necked pheasant	B,F,R	B,F,R	B,F,R	B,F,R
Sandhill crane		F,R	F,R	F,R
Killdeer	B,F,R	B,F,R	B,F,R	B,F,R
Mountain plover	F,R	F,R	F,R	F,R
Black-necked stilt	F,R	B,F,R	B,F,R	B,F,R
American avocet	F,R	B,F,R	B,F,R	B,F,R
Greater yellowlegs	F,R	F,R	F,R	F,R
Common snipe	F,R	B,F,R	B,F,R	B,F,R
Long-billed dowitcher	F,R	F,R	F,R	F,R
Dunlin	F,R	F,R	F,R	F,R
Least sandpiper	F,R	F,R	F,R	F,R
Western sandpiper	F,R	F,R	F,R	F,R
Ring-billed gull	F,R	F,R	F,R	F,R
Herring gull	F,R	F,R	F,R	F,R
California gull	F,R	F,R	F,R	F,R
Say's phoebe	F,R	B,F,R	B,F,R	B,F,R
Tree swallow	R	B,F,R	B,F,R	B,F,R
Cliff swallow	B,F,R	F,R	F,R	F,R
Violet green swallow	R	B,F,R	B,F,R	B,F,R
Northern rough-winged swallow	R	F,R	F,R	F,R
Bank swallow	B,F,R	F,R	F,R	F,R
Barn swallow	R	F,R	F,R	F,R
Northern mockingbird	R	B,F,R	B,F,R	B,F,R
American pipit	F,R	F,R	F,R	F,R
European starling	R	B,F,R	B,F,R	B,F,R

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Lark sparrow	B,F,R	B,F,R	B,F,R	B,F,R
Song sparrow	B,F,R	B,F,R	B,F,R	B,F,R
Savannah sparrow	B,F,R	F,R	F,R	F,R
Lincoln's sparrow	F,R	F,R	F,R	F,R
Red-winged blackbird	B,F,R	B,F,R	B,F,R	B,F,R
Western meadowlark	B,F,R	B,F,R	B,F,R	B,F,R
Yellow-headed blackbird	F,R	F,R	F,R	F,R
Brewer's blackbird	B,F,R	B,F,R	B,F,R	B,F,R
Brown-headed cowbird	F,R	B,F,R	B,F,R	B,F,R
House finch	F,R	B,F,R	B,F,R	B,F,R
Mammals				
Virginia oppossum	R	F,R	F,R	F,R
Muskrat		B,F,R	B,F,R	B,F,R
Norway rat	B,F,R	B,F,R	B,F,R	B,F,R
Black rat	B,F,R	B,F,R	B,F,R	B,F,R
Raccoon	R	B,F,R	B,F,R	B,F,R
Red fox	R	F,R	F,R	F,R
Coyote	R	F,R	F,R	F,R
Beaver		B,F,R	B,F,R	B,F,R
Reptiles				
Gopher snake	B,F,R	B,F,R	B,F,R	B,F,R
Common kingsnake	B,F,R	B,F,R	B,F,R	B,F,R
Common garter snake	B,F,R	B,F,R	B,F,R	B,F,R
Amphibians				
Western toad	F,R	F,R	F,R	F,R
Pacific tree frog	F,R	F,R	F,R	F,R
Agriculture - Upland				
Birds				
Great egret	F,R	F,R	F,R	F,R
Snowy egret	F,R	F,R	F,R	F,R
Canada goose	F,R	F,R	F,R	F,R
Ross's goose	F,R	F,R	F,R	F,R
Snow goose	F,R	F,R	F,R	F,R
White-fronted goose	F,R	F,R	F,R	F,R
Mallard	B,F,R	B,F,R	B,F,R	B,F,R
Northern shoveler	F,R	F,R	F,R	F,R
Gadwall	B,F	B,F,R	B,F,R	B,F,R
Turkey vulture	R	F,R	F,R	F,R
Swainson's hawk	B,F,R	F,R	F,R	F,R
Red-tailed hawk	F,R	F,R	F,R	F,R
Ferruginous hawk	F,R	F,R	F,R	F,R
Rough-legged hawk	F,R	F,R	F,R	F,R
Northern harrier	B,F,R	B,F,R	B,F,R	B,F,R
White-tailed kite	F,R	B,F,R	B,F,R	B,F,R
Golden eagle	F,R	F,R	F,R	F,R
American kestrel	F,R	F,R	F,R	F,R
Prairie falcon	F,R	F,R	F,R	F,R
Ring-necked pheasant	B,F,R	B,F,R	B,F,R	B,F,R
California quail	B,F,R	B,F,R	B,F,R	B,F,R
Sandhill crane		F,R	F,R	F,R
Killdeer	B,F,R	B,F,R	B,F,R	B,F,R
Mountain plover	F,R	F,R	F,R	F,R
Ring-billed gull	F,R	F,R	F,R	F,R
California gull	F,R	F,R	F,R	F,R
Rock dove	F,R	F,R	F,R	F,R
Mourning dove	B,F,R	B,F,R	B,F,R	B,F,R
Short-eared owl	F,R	F,R	F,R	F,R

Table S-4. Habitat Guild and Species Summary (Continued)

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Barn owl	F,R	F,R	F,R	F,R
Burrowing owl	F,R	F,R	F,R	F,R
Lewis' woodpecker		B,F,R	B,F,R	B,F,R
Nutall's woodpecker		B,F,R	B,F,R	B,F,R
Acorn woodpecker		B,F,R	B,F,R	B,F,R
Downy woodpecker		B,F,R	B,F,R	B,F,R
Red-breasted sapsucker		B,F,R	B,F,R	B,F,R
Northern flicker		B,F,R	B,F,R	B,F,R
Say's phoebe	F,R	B,F,R	B,F,R	B,F,R
Western kingbird	B,F,R	B,F,R	B,F,R	B,F,R
Horned lark	B,F,R	B,F,R	B,F,R	B,F,R
Tree swallow	R	B,F,R	B,F,R	B,F,R
Cliff swallow	B,F,R	F,R	F,R	F,R
Violet green swallow	R	B,F,R	B,F,R	B,F,R
Northern rough-winged swallow	R	F,R	F,R	F,R
Bank swallow	B,F,R	F,R	F,R	F,R
Barn swallow	R	F,R	F,R	F,R
Yellow-billed magpie		B,F,R	B,F,R	B,F,R
Northern mockingbird	R	B,F,R	B,F,R	B,F,R
American pipit	F,R	F,R	F,R	F,R
Loggerhead shrike	B,F,R	B,F,R	B,F,R	B,F,R
European starling	B,F,R	B,F,R	B,F,R	B,F,R
Lark sparrow	B,F,R	B,F,R	B,F,R	B,F,R
Savannah sparrow	B,F,R	F,R	F,R	F,R
Lincoln's sparrow	F,R	F,R	F,R	F,R
Golden-crowned sparrow	F,R	F,R	F,R	F,R
Dark-eyed junco	F,R	F,R	F,R	F,R
Red-winged blackbird	B,F,R	B,F,R	B,F,R	B,F,R
Western meadowlark	B,F,R	B,F,R	B,F,R	B,F,R
Brewer's blackbird	B,F,R	B,F,R	B,F,R	B,F,R
Brown-headed cowbird	F,R	B,F,R	B,F,R	B,F,R
House finch	F,R	B,F,R	B,F,R	B,F,R
Lesser goldfinch	B,F,R	B,F,R	B,F,R	B,F,R
Lawrence's goldfinch	B,F,R	B,F,R	B,F,R	B,F,R
American goldfinch	B,F,R	B,F,R	B,F,R	B,F,R
House sparrow	B,F,R	B,F,R	B,F,R	B,F,R
Mammals				
Virginia oppossum	R	B,F,R	B,F,R	B,F,R
Broad-footed mole	B,F,R	B,F,R	B,F,R	B,F,R
Yuma myotis	F,R	F,R	F,R	F,R
California myotis	B,F,R	B,F,R	B,F,R	B,F,R
Western pipistrelle	F,R	F,R	F,R	F,R
Big brown bat	B,F,R	B,F,R	B,F,R	B,F,R
Red bat	B,F,R	B,F,R	B,F,R	B,F,R
Hoary bat	B,F,R	B,F,R	B,F,R	B,F,R
Townsend's big-eared bat	F,R	F,R	F,R	F,R
Pallid bat	B,F,R	B,F,R	B,F,R	B,F,R
Brazilian free-tailed bat	F,R	F,R	F,R	F,R
Black-tailed hare	B,F,R	B,F,R	B,F,R	B,F,R
California ground squirrel	B,F,R	B,F,R	B,F,R	B,F,R
Fox squirrel	B,F,R	B,F,R	B,F,R	B,F,R
Botta's pocket gopher	B,F,R	B,F,R	B,F,R	B,F,R
Beaver	F,R	B,F,R	B,F,R	B,F,R
Western harvest mouse	B,F,R	B,F,R	B,F,R	B,F,R
Deer mouse	B,F,R	B,F,R	B,F,R	B,F,R
California vole	B,F,R	B,F,R	B,F,R	B,F,R
House mouse	B,F,R	B,F,R	B,F,R	B,F,R
Black rat	B,F,R	B,F,R	B,F,R	B,F,R
Norway rat	B,F,R	B,F,R	B,F,R	B,F,R
Kit fox		B,F,R		B,F,R

Group and Species	CALFED Region			
	Bay	Delta	Sac	SJ
Coyote	R	B,F,R	B,F,R	B,F,R
Gray fox	B,F,R	B,F,R	B,F,R	B,F,R
Racoon	R	B,F,R	B,F,R	B,F,R
Badger	B,F,R	B,F,R	B,F,R	B,F,R
Striped skunk	B,F,R	B,F,R	B,F,R	B,F,R
Bobcat	B,F,R	B,F,R	B,F,R	B,F,R
Mule deer	B,F,R	B,F,R	B,F,R	B,F,R
Reptiles				
Western fence lizard	B,F,R	B,F,R	B,F,R	B,F,R
Coast horned lizard	B,F,R	B,F,R	B,F,R	B,F,R
Western skink	B,F,R	B,F,R	B,F,R	
Western whiptail	B,F,R	B,F,R	B,F,R	B,F,R
Racer	B,F,R	B,F,R	B,F,R	B,F,R
Coachwip	B,F,R	B,F,R	B,F,R	B,F,R
Gopher snake	B,F,R	B,F,R	B,F,R	B,F,R
Common kingsnake	B,F,R	B,F,R	B,F,R	B,F,R
Common garter snake	B,F,R	B,F,R	B,F,R	B,F,R
Western terrestrial garter snake	B,F,R	B,F,R	B,F,R	
Western rattlesnake	B,F,R	B,F,R	B,F,R	B,F,R
Amphibians				
Western toad	F,R	F,R	F,R	F,R
Pacific tree frog	F,R	F,R	F,R	F,R

NOTES:

Species habitat use and distribution status is derived from DFG's Wildlife-Habitat Relationship database. Information is presented only for plant communities that could be affected by CALFED actions in each region.

Bay = Bay Region.
Delta = Delta Region.
Sac = Sacramento River Region.
SJ = San Joaquin River Region.

B = Breeding habitat.
F = Foraging habitat.
R = Resting habitat.

Table S-4. Habitat Guild and Species Summary (Continued)

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REFERENCES - SUPPLEMENT

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